



# PROSTHODONTIA



## Anatomical Arrangement of Artificial Teeth.

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While undertaking the writing of a paper on a subject which is old in dental literature, the words of a prominent physician recur to my mind. He said, "If a physician has a certain method which he wishes to bring before the medical profession, he usually must present it six or seven times before it is favorably received." To a small degree this is true of the dental profession, for two excellent chapters have been written on the anatomical arrangement of artificial teeth according to geometrical laws, one in the *American System of Dentistry*, the other in *The American Text Book of Prosthetic Dentistry*, and several articles of the same character have appeared from time to time in the journals, yet regardless of all that has been written, the anatomical arrangement of teeth has not received the attention which it deserves at the hands of the profession. Probably the reason why this subject has received so little attention is that so much has been written from a theoretical standpoint to convince the doubting and prejudiced ones that the laws underlying the anatomical arrangement of teeth are correct, while from a practical standpoint very little has been said, leaving those who would accept the theories somewhat in the dark as to the method to pursue in putting theories into practice. This paper will deal directly with the practical part of the work, laying theories completely aside.



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In this enlightened age, it is needless to say that the anatomical articulator is the true and correct instrument upon which to arrange artificial teeth, and, if anyone is prejudiced, let him try for himself and see if he can be convinced that he has made a step forward in this field.

In studying the bent of many practitioners it cannot but be observed that the prosthetic field of dentistry is the least desired, and as a rule greatly slighted; and it seems strange indeed that a means to benefit humanity, "which dentistry is always proclaiming," should be so sadly neglected. Many people today, yes, thousands of people are swallowing their food in a partially masticated condition, and receiving little pleasure or satisfaction from one of life's great joys, eating, because they are unable to properly masticate their food with the artificial dentures provided by men who call themselves dentists.

After studying all the literature procurable on the arrangement of teeth, the writer was unable to comprehend every detail of the work. There was something lacking from the knowledge imparted by reading, preventing his work from being a complete success. Realizing this, and becoming greatly interested, a trip was made to Dr. Bonwill's office with the object to learn if possible some of his methods. Those who ever met Dr. Bonwill in his office, learned to know his peculiar nature and the curious place he had. I did not know whether I would meet a man who was willing to impart his knowledge to another or not; in fact, I expected to be told he was too busy to see me. To my surprise I was cordially greeted by a small man, very active and partially deaf, he having to use an ear trumpet. His first question was, "What do you want?" My answer, "I wish to learn something." Second question, "What do you know?" Answer, "Nothing." Finally he asked, "Then what do you expect to learn from an old man like myself?" Desiring to please him, I spoke of the interest I had in his methods of work and of my inability to grasp the information desired by reading.

There were several people waiting in the reception room and a patient in the chair, but he was so anxious to impart his knowledge to one willing to learn that he apparently forgot he had others waiting for him, and he spent about half an hour piling models of every description upon my lap and upon chairs, explaining very rapidly their significance. It was too much to grasp the new ideas before me at once, so about two hours were spent studying those models. The one, particularly interesting, was a full upper and lower set of teeth mounted upon the anatomical articulator. Upon examining this case it was plain to be seen that the subject could not be grasped to its full extent by reading; the principal feature to be noted was the method of grinding each tooth separately so that it

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would properly articulate with its opponents in the movements of the jaw, as well as to be useful in cutting and grinding the food.

My next desire was to have an opportunity of going to the laboratory to see the work done on practical cases. I was told if I should come another day early, I could talk more with him and he would take me to his laboratory to watch his assistant, Dr. H. B. Cressman, who is now located in Philadelphia, and to whom I am also greatly indebted.

Being eager to learn and greatly enthused over what had been seen, the following morning found me at his office at seven thirty. Upon being ushered into the reception room, the doctor was seen sitting at his desk writing. He did not look up until half an hour had passed, and upon seeing me, he said, "Young man, I thought I told you to come early; I have been here since five thirty; I have no time to talk to you now, you may go to my laboratory at nine o'clock."

Five or six years have now passed since my acquaintance with Dr. Bonwill and the pleasant experiences I had in his office. Since then, the work of grinding and arranging artificial teeth according to his method has been most diligently pursued with results gratifying in the extreme.

Before proceeding with a description of the work,

**The Masticating Power** it may be well to take up the study of the power of  
**of the Jaws.** the human jaws with the natural teeth in position,

so that we may have a better idea of that which is required and the deficiency to be remedied by supplying artificial substitutes, properly constructed to take the place of the lost natural organs. It is a little astonishing when we stop to think of the power that may be exerted by the masticating muscles.

The greatest pressure is sustained by the molars, the gnathodynamometer registering ordinarily from one hundred and fifty to two hundred and seventy pounds. Where there is any inflammation of the peridental membrane, or any other cause to make the teeth a little sensitive, the pressure exerted will be very low, sometimes not more than forty pounds; but with good, healthy teeth the pressure is great. Dr. E. K. Wedelstaedt, of St. Paul, Minn., has recorded within his own practice a pressure made by a patient of three hundred pounds. This is probably the highest pressure recorded.

What conclusions may we arrive at from these records? Not every person can exert such an enormous pressure, ranging from two hundred and twenty-five to three hundred pounds, and even, if one could, he would not exert the maximum stress with every bit of food taken. We shall be safe in saying that the average degree of pressure exerted by the majority of people in eating is between one hundred and one hundred and fifty pounds.



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### **Stress Exerted Upon Artificial Teeth.**

When the natural teeth have been lost and artificial dentures substituted, it must be remembered that the mucous membrane of the mouth withstands all the pressure brought to bear; consequently so much pressure cannot be exerted upon artificial dentures as may be exerted upon natural teeth. The muscles are not deficient in their power; the decrease of stress depends upon the tenderness of the mucous membrane.

Compared with the natural organs, the pressure that may be exerted is very low, the gnathodynamometer registering from twenty to thirty-five pounds, and in some cases forty. The following paragraph is copied from a paper written by Dr. G. V. Black, appearing on page 476 of *The Dental Cosmos*, 1895:

"While I have made no particular effort to obtain many tests of the stress that could be exerted upon artificial teeth, I have tried a number of persons. On full plates, upper and lower, the stress exerted has been from twenty to thirty pounds. On upper plates, with natural teeth below, forty pounds has been exerted in a few cases; and Dr. G. B. Cary, of Perry, Ill., a dentist, made the remarkable record of eighty pounds upon artificial teeth above and natural teeth below. It must be said that the exertion of the full stress possible to artificial teeth is not practical with the mouth opened as wide as is necessary in biting on the gnathodynamometer, but with all allowance for this, these trials show them to be sadly deficient in masticating power as compared with the natural organs. Perhaps it is well that so many people fail to realize what they have lost, and, as the recovery of it is not within the range of possibility, perhaps the less said about it the better. But a study of the records of the gnathodynamometer and the records of the phagodynamometer show only too plainly what it is."

While, as Dr. Black has stated, the recovery of the full power of mastication with artificial dentures is beyond the range of possibility, yet, to a great extent that may be overcome by artificial dentures being constructed upon a true, mechanical basis.

### **Power Necessary to Masticate Meats.**

We have now seen the deficiency of power exerted upon artificial dentures as compared with the natural organs, and it will be of much interest to study the power necessary to crush different kinds of meat and see what results are obtained by different degrees of force exerted upon them necessary for their mastication.

Again the liberty is taken to quote the records obtained by Dr. Black, which he made in the presence of Dr. Geo. H. Cushing, Dr. C. N. Johnson, Dr. G. L. Gilmer, Dr. Geo. J. Dennis and Dr. E. C. Swain. These

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gentlemen secured at a restaurant the necessary food for their tests, and ordered only such food as was desired for eating. A cut of the phagodynamometer used for these tests may be seen by referring to page 480, *The Dental Cosmos*, 1895.

	Pounds.
Boiled corned beef, nice and tender.....	30 to 35
Beefsteak, medium, well done.....	40 to 60
Beefsteak, well done.....	45 to 65
Beefsteak, rare, very tender.....	35 to 40
Beefsteak, round .....	40 to 50
Beefsteak, well done, rather tough.....	60 to 80
Mutton chops .....	30 to 40
Mutton steak .....	35 to 45
Roast veal, tender and nice.....	35 to 40
Roast loin of veal.....	30 to 35
Roast beef .....	45 to 60
Roast beef, loin.....	35 to 50
Pork chops, loin.....	20 to 25
Roast pork.....	30 to 35
Broiled ham, tender and nice.....	40 to 60
Cold boiled tongue, central part.....	3 to 5

A record was also made of tougher meats as follows:

	Pounds.
Cut from shank of old animal:	
Fried, rare.....	60 to 80
Fried, well done.....	70 to 90
Cut from neck.....	70 to 90

Candies, nuts, vegetables, etc., were also tested and records made of same, but they have little bearing on this subject and will be omitted. Enough has probably been written to convince one that it is a difficult problem to masticate meats with artificial dentures when the maximum pressure that may be exerted upon them is below forty pounds.

If artificial dentures could be made by using extracted natural teeth, the problem of masticating food would be an easier one; but when we are confined to the small, smooth, highly polished surface of the artificial teeth now on the market, with lines for sulci, what may we hope to accomplish? Plate work at its best is disliked by the greater number of practitioners, and even more so by the college student. Probably the cause for this is the lack of interest in the work, or possibly not enough time is taken to make the work such, that it will give comfort and satisfaction to the patient. At any rate, too many kicks and grumbles are received in return to make it anything like a pleasure, whereas, with





operative work, fillings may be poorly inserted but the patient may be ignorant of the fact until the failures appear. When more interest is taken in this work and a greater effort made to please the patients, who are so unfortunate as to need artificial dentures, dentistry will then move to even a higher position than it now occupies, and will thereby bestow a great blessing upon a most dissatisfied humanity.

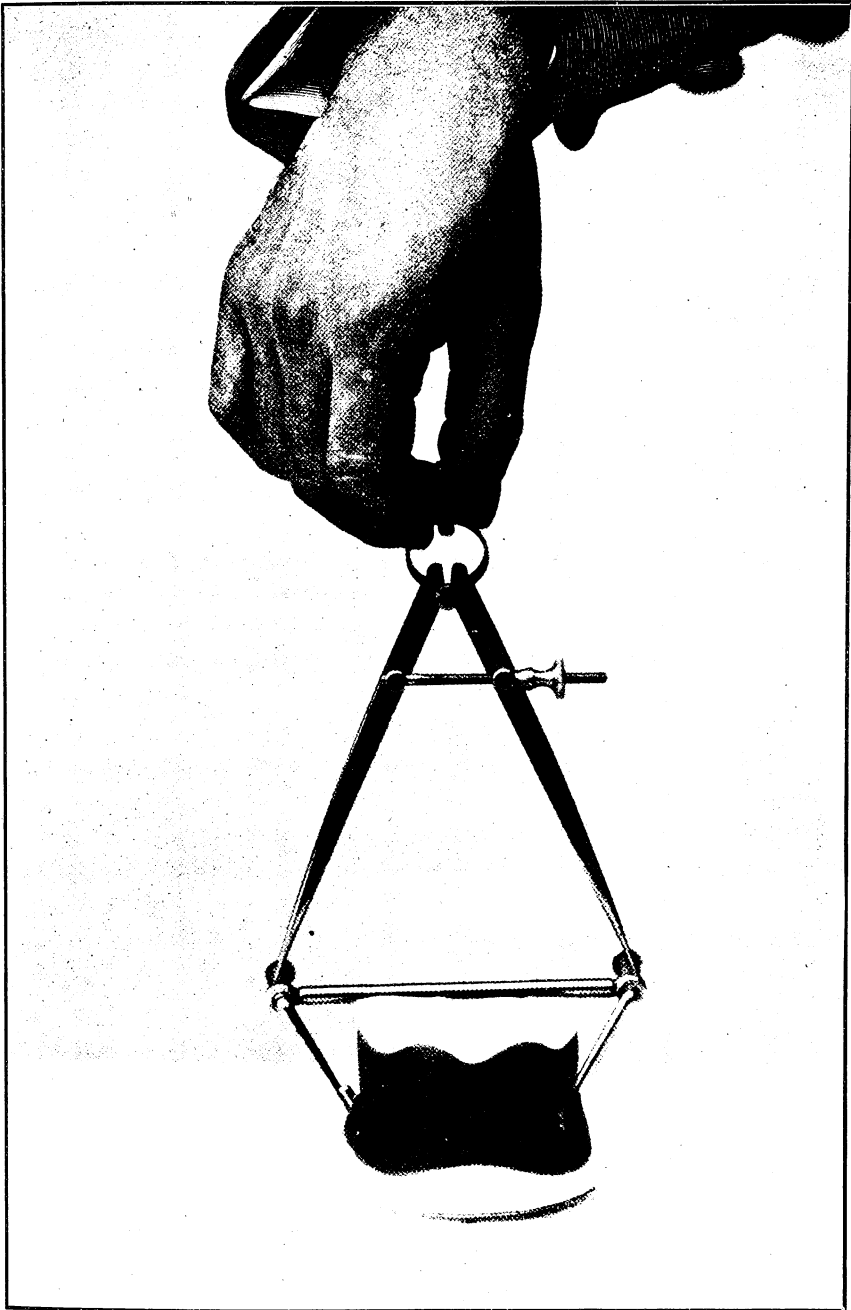
The question of securing the relationship of the  
**Taking the Bite.** jaws in order to have a guide for setting the teeth is a somewhat difficult one. Numerous methods have been employed but so far there has been no positive way by which we may be certain that the lower jaw is in a position of rest, the condyles resting normally in the Glenoid fossae. The so-called "mush bite," that of placing a soft roll of wax in the mouth and instructing the patient to "bite," will not do in using an anatomical articulator; in fact, it is an impossibility to secure good results if the bite is taken in this way.

The method which is probably acknowledged to be the best and has been adopted by the greater number of men, consists in making over the model a base plate of warm, sheet, pink paraffin wax or ideal base plate material, trimming it to the desired form and sealing it tight to the model with a hot spatula. After this, several sheets of pink paraffin wax are warmed until quite soft, and with the thumb and index finger of each hand the warm wax is quickly drawn out and pressed between the fingers into a square rope of about five inches in length and half an inch in thickness. This is then curved upon the base plate upon the model, following the ridge and sealing well to the base plate at all joints. It is then made smooth with a knife ready to be tried in the mouth to ascertain the contour of the lips and face, and the length of the teeth.

The wax should be just about the length of the lips, but the operator will have to judge for himself in cases where the lips are abnormally short or long, in which case it is well to place a tooth in the wax to see how it will look in different positions in the mouth. The length of the wax then will represent the exact length to be given to the teeth.

It is best to try the upper bite plate first and get it as near perfect as possible, and then the lower. One should study a normal mouth with perfectly arranged natural teeth to have a definite idea of the relation of the teeth to the lips; by getting this firmly established in one's mind, the task will be an easy one in trimming the wax to the right length and fullness.

Both bite plates are now ready to try in the mouth together to see if they strike uniformly upon their occluding surfaces. If they strike in the back and not in the front, wax should be cut from the back as the



*Fig. 1.*





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front has been previously trimmed to represent the exact length of the teeth. When satisfied that both wax plates strike uniformly over their entire occluding surfaces and the lips close normally without being distorted, the plates should be removed from the mouth and placed again upon the models to remedy any change in their shape that may have taken place. They should then be placed in cold water to make the wax as hard as possible. They are then ready to be placed in the mouth again to secure the exact relation of the lower jaw to the upper. The wax being hard will prevent their sticking together, and many trials may be made if necessary to get the lower jaw in a position of rest.

A good way to accomplish this is to have the patient thrust the jaw forward and then walk away from him for a minute or two. The muscles will become tired by being in a strained position and soon the jaw will slide back unconsciously into a position of rest. Returning to the patient, instruct him not to move and with a hot instrument the wax plates may be sealed together, the lips being held well out of the way so as not to be burned. The median line of the face should then be marked in the wax and if the patient can be made to laugh, the high lip lines may also be marked, which will indicate whether single teeth or block sections are to be used. The wax plates are now ready to be removed together. If they are pulled out of the mouth with the fingers, their shape might be changed. Instruct the patient to push them out with the tongue and he will be able to do it very nicely. Place them back on the models, sealing them tightly, ready to be placed on the articulator.

A Bonwill articulator shall be used for illustration. Place the articulator on a flat surface with the bows pointing towards you. Throw back the upper bow and place the models on the lower as straight as the eye can judge. Next take a pair of dividers and measure the width of the condyles of the articulator by placing the points of the dividers in the little hole found at each side of the articulator just in front of the springs (Fig. 1). Leave one end of the dividers in the hole and swing the other around until it reaches the median line marked on the lower bite plate, representing the median line of the lower incisors at their incisive edges. Change the dividers to the opposite side of the articulator, repeating the same, to be sure to get the models in the center and not too far forward or backward. This forms the equilateral triangle on the articulator, representing the measurements of the human jaws as nearly as possible, by which law the articulator was constructed.

Before proceeding further, a few words may be said in regard to the plaster models. They should always be neatly trimmed, because if they are bulky and irregular, they will deceive the eye in securing sym-



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metry and one can do better work with the models neat and regular. They should be of the same thickness, the lip line being midway between the upper and lower bows of the articulator, both bows being parallel to each other.

This does not take much time and when a person gets into the habit of doing everything as neatly as possible, it instils more love into the work and thereby better results are obtained. When other dentists visit your office they will remark about the neatness of your work and will leave with a good opinion of you.

The models now being ready to be attached to the articulator, the upper bow is placed back in position and soft plaster added to the upper model covering the bow. When this is fairly hard, the articulator is turned over and the lower one is attached. This prevents moving of the models and attaches them in their exact position indicated by the dividers. If plaster is first placed upon the lower bow and the models set



*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



*Fig. 5.*

down in it, it may become hard before their exact position is secured by measuring, so it is best to have the models in position before adding any plaster.

While it is best to use plain teeth wherever possible, there are cases when the use of other teeth are indicated. This is determined by the high lip line in laughing as previously mentioned. If the patient will show the gums to any great extent it will be best to use block sections, but plain teeth are always preferable when the indications are such that the gums will not be objectionable. When making continuous gum sets this is not taken into consideration, for the porcelain gums are far superior to rubber.

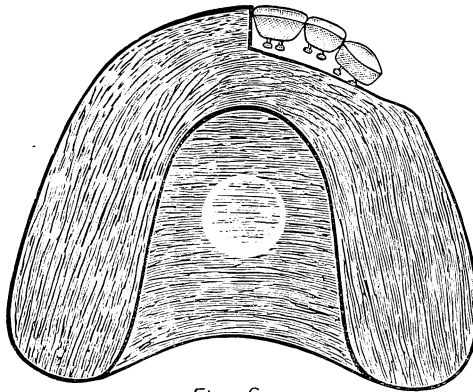
It is a little difficult to find desirable teeth at the dental depots. The molars and bicuspid are usually too narrow bucco-lingually or mesio-distally. The buccal cusps are nearly always found longer than the lingual, but the greatest objection is—they are not thick enough occluso-gingivally to facilitate the necessary grinding. Select large bicuspid



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and molars which are thick occluso-gingivally as indicated by the line (a) in Fig. 2. Fairly long bite teeth should be chosen in selecting the incisors and cuspids.

**Method of Grinding Incisors and Cuspids.** That which probably requires more skill and time than anything connected with plate work is the grinding of the teeth. There is no guesswork about it and one is liable to neglect this important feature to a certain extent, unless one loves the work and becomes pleased with that which is accomplished. As the incisors and cuspids are to be placed upon the wax first, it will be necessary to describe the method of grinding them now, leaving the grinding of the bicuspid and molars till later. Fig. 3 shows the approximal view of an upper incisor ground from the lingual surface to a sharp incisive edge. The dotted line shows the contour of the tooth before grinding. When looking at the labial face of a



*Fig. 6.*

tooth so ground, no difference is discerned in its shape. The upper cuspid is ground in the same manner.

The grinding of the lower incisors and cuspids is just the opposite from that of the upper. They are ground on the labial surface as illustrated in Fig. 4, the dotted line showing the contour of the tooth before grinding. The question may now arise in the minds of many whether this will destroy the appearance of the lower incisors by being ground on the labial surface. This is readily answered by the word no! They may be polished with a disk if thought necessary, but when wet with saliva the ground surfaces will not be recognized. By referring to Fig. 5, the object of this grinding is understood by studying the use of the

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incisors—that of cutting the food. They act in the same way as a pair of scissors.

## Arranging Incisors and Cuspsids.

In no case should the wax be torn from the models in order to set up the teeth. With a knife enough wax is cut from the upper bite plate to the right of the median line to admit of the central, lateral and cuspid being placed in position. The wax to the left of the median line remains the same as when taken from the mouth, it being

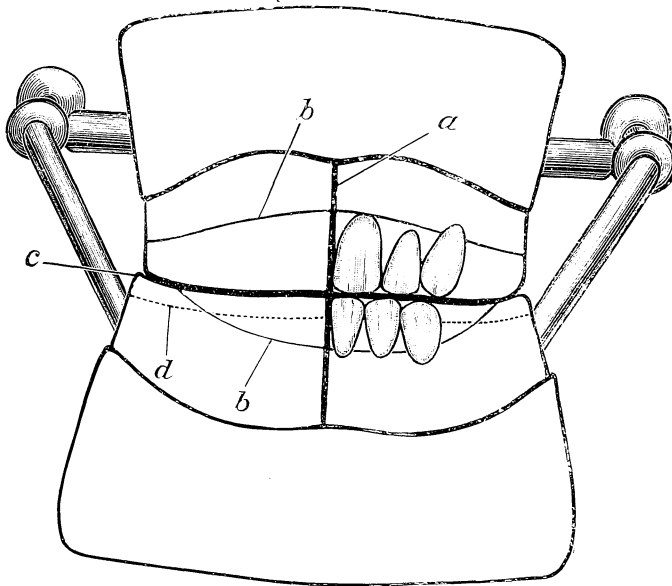


Fig. 7.

a guide in determining the fulness of the lip (Fig. 6). The length of the teeth should be just the length of the wax. So much for the arrangement of the uppers.

The same procedure is now carried out with the lower incisors and cuspid on the right; just enough wax being cut away to admit of their being placed in position, their length being just the length of the lower wax. The fulness of the lowers is gauged by the uppers; they should be set a little to the inside of the uppers so that in obtaining the overbite the uppers will overlap the lowers. As the teeth are now set no overbite has been allowed, the incisal edges meeting at the lip line, the lowers a little to the inside of the uppers. Here is where a set screw on an artic-

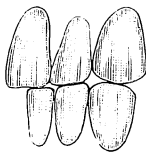


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ulator is of no service. The occluding surfaces of the wax serve the purpose of holding the models the required distance apart.

We are now ready for the overbite; determining the amount of overbite wished, which should never be more than an eighth of an inch. Wax is cut from the occluding surfaces of the bites, little by little, until the upper teeth overlap the lowers. Care should therefore be exercised in not removing too much of the wax, which would allow the overbite to be too great. This may better be understood by studying Fig. 7.

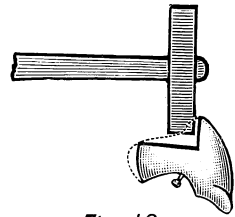
Now is the time to ascertain if the teeth are properly set so that their incisive edges will touch evenly when the lower model on the articulator is moved to the side. Grasp the upper model in the left hand and the lower in the right, and move the lower to the side bringing the incisive edges of the teeth together. It will probably be found that the cuspids are too long, being the only teeth to touch; if such is the case, they should be removed and the cusps ground in such a way that when



*Fig. 8.*



*Fig. 9:*



*Fig. 10.*

they are replaced on the wax the three teeth above will strike evenly the three teeth below. Fig. 8.

The grinding of the bicuspid and molars is the **Method of Grinding Bicuspid and Molars.** most difficult part of the whole procedure, and one's fingers are likely to become a little sore before the case is completed, but the results obtained will more than reward one for the effort.

The overbite given to the incisors determines the depth of the sulci of the bicuspid and molars. It is well, therefore, not to give too great an overbite for it would necessitate considerable grinding with danger of weakening the teeth.

The buccal cusps should be no longer than the lingual but as nearly all artificial teeth are made with this defect, the first step in the procedure is to grind the buccal cusps to a level with the lingual as Fig. 9 will show. The tooth is then ready for the grinding of the sulcus, which is done with a small stone, the tooth being held in the position as seen in Fig. 10.

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This illustration is that of an upper molar, the sulcate groove being cut through the buccal cusps; the lingual surface of the lingual cusps is also ground to make the lingual cusps sharp. This presents a tooth with both cusps sharp, the sulcate groove being near the buccal surface. The same rule is applied to the upper bicuspsids, the grinding is done in the same manner. (This is a little different from the method of Dr. Bonwill, which is that of making the lingual cusps of the upper bicuspsids and molars, and the buccal cusps of the lower bicuspsids and molars round.)

The grinding of the lowers is the opposite from that of the uppers, the sulcate groove being made through the lingual cusps, with the buccal surface of the buccal cusps ground to make the buccal cusps sharp. Fig. 11. A glance at Fig. 12 will demonstrate more clearly the usefulness of this method of grinding.

The second lower bicuspid is ground the same as the lower molars,



*Fig. 11.*



*Fig. 12.*



*Fig. 13.*

but there is a slight variation in the grinding of the first lower bicuspid. The natural lower first bicuspsids are devoid of lingual cusps and the artificial tooth should be given the same form, Fig. 13. There are two reasons for this. First, a lingual cusp would be a constant annoyance by being in the way of the tongue. Second, lower first bicuspsids occlude with the distal half of the upper cuspid, thereby making a lingual cusp useless.

It is the writer's method to grind a tooth and set it on the wax in its proper position before proceeding with the grinding of the next tooth in line. If one should prefer to grind them all before placing any on the wax, it may be done; however, it is probably easier to do the former as each tooth has to be ground to articulate with its opponent and in the end he may thus save extra work.

In regard to the stone to be used. It should be carborundum, small, with medium grit. A moist sponge should be placed against it while in the process of grinding to prevent the angles from wearing



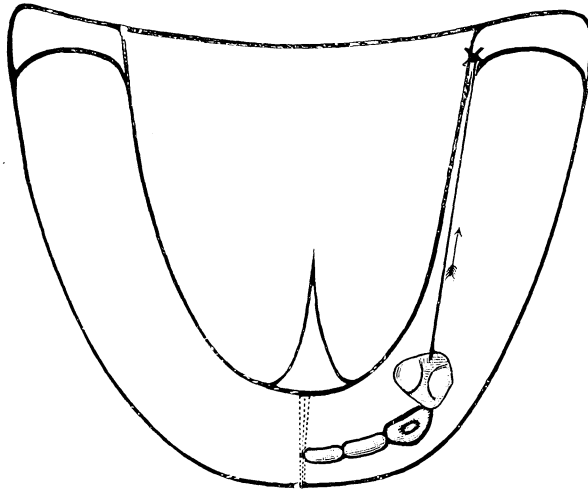
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round. To hold a wet sponge in the hand while grinding is a little awkward. A very simple device may be arranged by fastening a very heavy wire to the bench with a sponge tied on the end, allowing this to lie against the stone.

### **Arranging Bicuspid and Molars.**

The lower first bicuspid is the next tooth to be placed upon the wax. As the six anterior teeth form the segment of a circle, the circle is broken at the distal surface of the cuspid by the bicuspid being set a little lower than the cuspid, its sulcate groove pointing straight toward the inner border of the ramus of the jaw. Fig. 14.

Next in order is the upper first bicuspid, which is placed in position



*Fig. 14.*

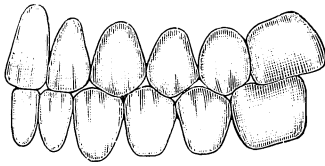
to occlude with the distal half of the lower first bicuspid. Before proceeding further, the lower model should be moved to the side to ascertain if the buccal cusp of the upper bicuspid articulates with the buccal cusp of the lower, at the same time the centrals, laterals and cuspids touch on their incisive edges. If the bicuspid does not touch the sulcate groove should be made deeper. If they touch too hard, the groove has been made too deep for the overbite and the cusps should be ground shorter until all the teeth above articulate with their opponents below.

The next tooth in line is the lower second bicuspid. It is set a little lower than the first bicuspid, its sulcate groove pointing toward the inner border of the ramus of the jaw.

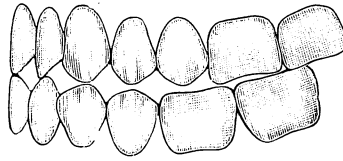
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Following this is the upper second bicuspid which is placed in occlusion with the distal half of the lower second bicuspid. The lower model is again moved to the side to see if the articulation of these two teeth is correct; if not, it should be made so before proceeding to the next tooth.

In holding the articulator now about two feet from the eyes, there will be noticed a downward incline of the teeth from the cuspids to the distal surface of the second bicuspid. When the first lower molar is

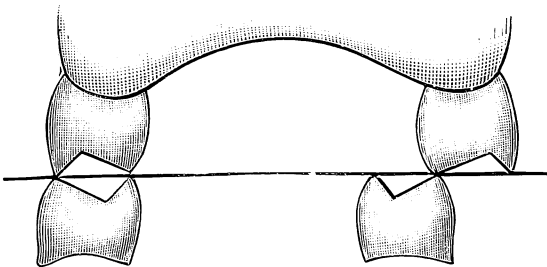


*Fig. 15.*



*Fig. 16.*

placed in position, its mesial cusps are placed on a line with the cusps of the second bicuspid, but its distal cusps are inclined upward, Fig. 15. This illustration gives an idea of the vertical curvature, as well as the articulation of the teeth when the articulator is moved to the side.



*Fig. 17.*

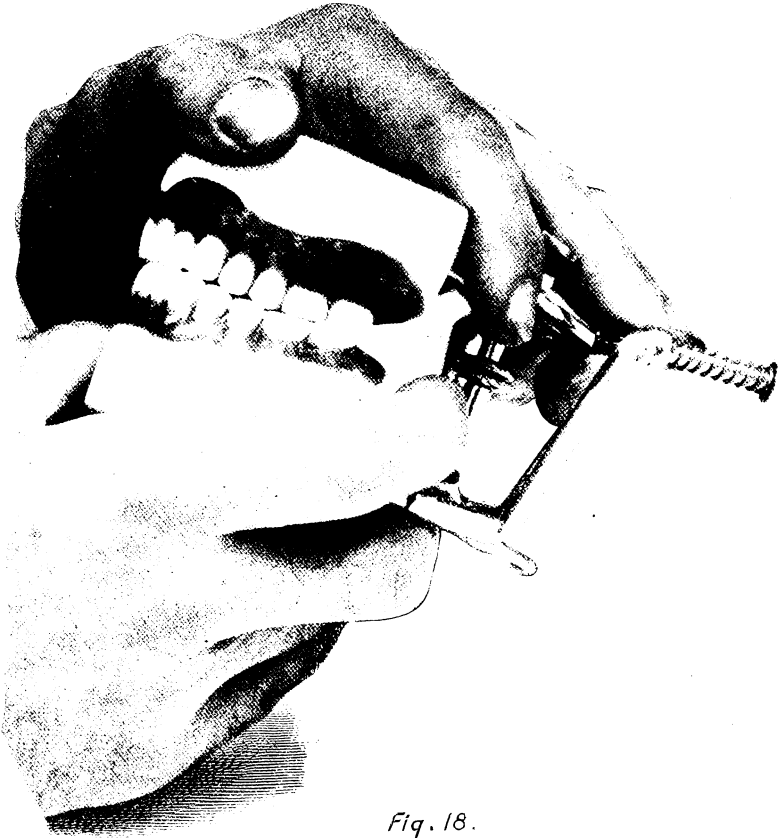
The upper first molar is placed in position after the lower first molar has been satisfactorily arranged, followed by the lower second molar, which is inclined upward still more than the first molar. Following this is the upper second molar.

So far we have moved the lower model on the articulator simply to the side, but now, when all the teeth on one side are waxed in place, the lower model should be brought directly forward to see if the vertical



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curvature is as great as the overbite. In this position the incisors are brought edge to edge while the rest of the teeth swing free except the second molars, the distal cusp of the lower second striking the mesial cusp of the upper second, Fig. 16. If it is found that the teeth do not strike in this manner, they should be arranged so that they will strike. It is exactly the same in a perfect natural set of teeth. It serves the



*Fig. 18.*

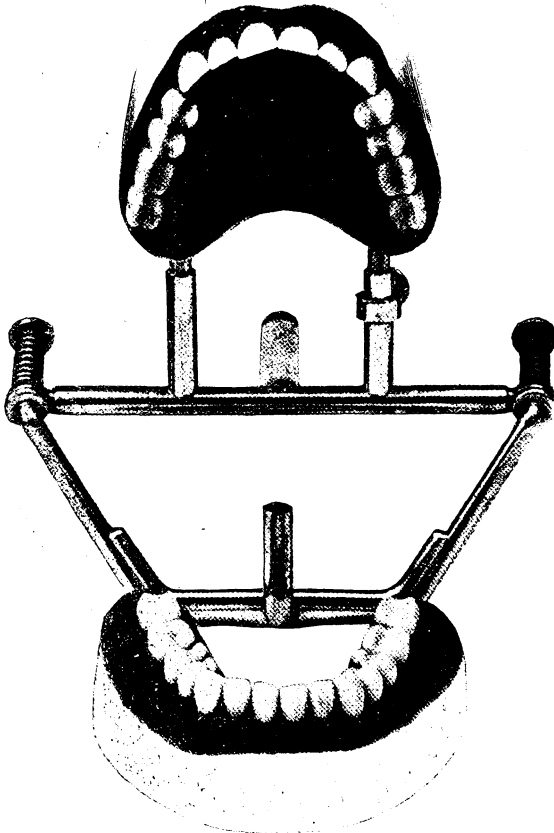
purpose of equalizing the pressure. In artificial dentures, it prevents them from tilting in the back when pressure is brought to bear on the front.

The rules governing the arrangement of the teeth on one side, govern the arrangement of the teeth on the other in the same manner, every step



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carried out as described. There is this to be taken into consideration however; when the teeth on both sides are waxed in place, the lower model is moved, say to the left. All the teeth on the left then will be in contact with their opponents from the second molars to the centrals, while on the right, the second molars will be the only ones to strike, the



*Fig. 19.*

buccal cusp of the lower molar striking the lingual cusp of the upper. Fig. 17. (It is to be noted from this that the lingual cusps are just as prominent as the buccal and serve just as great a means of masticating the food.)



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When the lower model is moved to the right, the same rule holds good; all the teeth on that side coming in contact, while on the left the second molars are the only ones to strike. This prevents the dentures from tilting on one side when pressure is brought to bear on the other.

Fig. 18 illustrates a practical case, full upper and lower, with the



*Fig. 20.*

lower model moved to one side bringing the buccal and lingual cusps of both upper and lower in contact. This also shows the vertical curvature of the teeth.

Fig. 19 shows the articulator open, giving an idea of the arrangement of the teeth upon the ridge. The incisors forming the segment of a circle,

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the bicuspid and molars running straight toward the inner border of the ramus.

In Fig. 20 we have an entirely different case. This is a photograph taken of a full upper and lower set of teeth, which were not ground, being set up just as they came from the dental depot. In this case all the rules were followed except moving the articulation to the side and forward, the hinge movement being the only one employed in setting these teeth. The object in doing this was to see what the result would be when teeth are set up on a straight line articulator. It can be seen that the incisors strike when the lower model is moved to the side, but the bicuspid and molars are about an eighth of an inch apart. A person wearing this set of teeth could only get satisfaction from using the hinge movement, simply mashing the food. These illustrations alone should convince anyone who has doubts about the accuracy of the anatomical articulator, or the method of grinding the teeth; teeth set up in this way give greater satisfaction than those set up on a straight line articulator.

Not all the cases presented for artificial dentures are perfect. The jaws may be irregularly shaped and difficult to make plates that will be satisfactory; yet, they can be made and an effort should be put forth to come as near perfection as possible.

Those cases presenting a protruding lower jaw are probably the most difficult to handle. If all the lower teeth from the centrals to the molars are to protrude beyond the uppers, the grinding should be just the reverse of that which has been described, the uppers being ground the same as the lowers would be for a normal case, the lowers being ground the same as the uppers would be for a normal case.

If the mouth were one where the lower incisors were to protrude beyond the uppers, but the bicuspid and molars below were inside the uppers as in a normal case, the incisors should be ground as described for a protruding jaw, while the bicuspid and molars should be ground as described for a normal case.

The statement has been made many times that it is very well to employ a given method of grinding and arranging teeth for cases that are suitable, especially in edentulous mouths, but that it is a different proposition when making partial dentures.

To this it can be said that good results may be obtained by trying to make every partial denture as near perfect as possible, and at times it necessitates the grinding of some of the natural teeth in the mouth, which are rough and irregular, but with patience and skill partial dentures can be made that will answer the purpose of masticating food ad-



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mirably. Wherever possible, the teeth for these cases should be ground sharp and arranged for the lateral and forward movements of the jaw.

While it formerly took the writer about eight hours to grind and arrange a full upper and lower set of teeth following this method, it now takes about two hours, as the work has become more familiar, but to a beginner it will probably take some little time before every step of the work is clear in his mind.

It is an art worth achieving at any rate, and when patients who have been in the habit of wearing artificial dentures, the teeth having been set up on a straight line articulator, say, "I never knew what it was to eat before until you made these teeth, although I have four or five different sets at home on the shelf," then this kind of work becomes a pleasure and few complaints are received in return for your effort.

The day is rapidly coming when this work will occupy a foremost position in the profession, possibly branching into a specialty, the same as orthodontia. Dr. Bonwill labored for thirty years with the dentists throughout the world to accept his methods, receiving little encouragement, yet he had some comfort which is shown by the following words, written in favor of the anatomical articulator in his last contribution to dental literature before his death:

"While I almost despair of so placing it and the laws regulating it that all men may see and practically apply it as I do, yet I have some comfort when I recall the beautiful and philosophic language of Kepler when he worked out and proved beyond doubt the laws of motion. He knew from all previous history that it would be many years before others could mathematically see it as it was revealed to him. He said, 'God has waited six thousand years to reveal this to me, I can afford to wait a century to have others receive it.' It is long that I have waited and labored for its full recognition, although but few have practically used it in the high art of dentistry."

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### A Bridge Tooth.

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BY D. D. LESTER, Christiansburg, Virginia.

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I have found a tooth constructed after the plan of the "J. Y. Crawford Crown," convenient in place of the ordinary bicuspid and molar dummy in bridge work. To make such a tooth, select a rubber plate

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tooth of suitable size, shape and color, allowing for the thickness of gold: then from twenty-eight gauge gold, make a jacket or cup in which the tooth will fit snugly, Fig. 1, allowing the gold to come about to the grinding or occlusal surface, except at the buccal or especially mesio-buccal aspect where it should be cut away for æsthetic reasons.

The cup or jacket is quickly and easily made by taking a strip of plate (twenty-eight gauge) and bending around the tooth to get the correct length, making it rather large in diameter, to permit of proper contouring; then push the tooth in place in the tube thus formed and mark the length and slope of the tooth on the inside of the tube as a guide in cutting the cervical end of the jacket. When it is cut to the proper length and slope it will perhaps need some shaping with the contouring pliers; probably the cervical end on the buccal side may need drawing in to make it fit the contour of the tooth; and perhaps contraction may be indicated at the occluso-lingual edge also. When shaped satisfactorily, place on a piece of plate for a bottom and solder. Put the tooth in the jacket, Fig. 2, and arrange on the articulator, when in a satisfactory posi-



*Fig. 1.*



*Fig. 2.*

tion, run a little investing material around the cervical end to hold in position. After removing the tooth, solder the jackets and crowns to your bridge, polish and cement the tooth in place. You have a bridge in which the porcelain has not gone through the fire, and if broken in any way, it can be quickly and easily replaced without removing the bridge from its abutments, by simply selecting another tooth and cementing it in place. The tooth is much neater in appearance than the old style dummy and requires less time to make. Undercuts can be ground in the tooth with wheel or disk, and the inside of the jacket should be roughened with a cross-cut fissure bur to secure adhesion of the cement.

The same jacketed tooth soldered on a cap fitted to the root of a natural bicuspid is the "Crawford Crown" and it is a good strong one, as the jacket affords strength, as well as a means of replacement in case of accident.



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## Porcelain Crowns.\*

By HART J. GOSLEE, D.D.S., Chicago, Ill.

(Chapter XII, continued.)

With Band and Dowel; Bands, Floor, Dowels, Accurate Fitting Dowels, Impression and "Bite," Facing, Investment, Soldering Facing, Anterior Crowns, Bicuspid Crowns, Molar Crowns; With Facing, Without Facing.

### With Band and Dowel.

As the employment of a band is generally conceded to be productive of the most universally successful results, this style of construction will be given precedence in this consideration, and be followed by the varia-

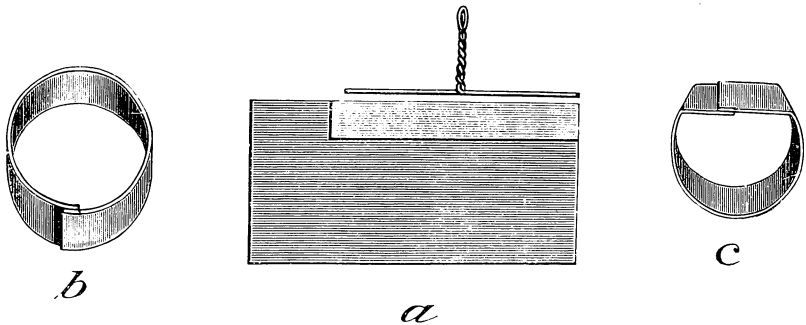


Fig. 182.

tions, the indications for the application of each of which having been previously mentioned.

#### Bands.

The band should be made of platinum not thicker than 28 nor thinner than 29 gauge, and the edges should be slightly overlapped before soldering. This latter should be observed as a means of securing additional strength, and of precluding the subsequent opening of the joint from the expansion of the metal which is induced by the degree of heat necessary to fuse the porcelain. The *exact* length of the measurement of the root, taken in the ordinary manner, and cut and straightened as indicated, should be designated by cutting a small nick in the edge of a piece of platinum plate from which the band should then be cut about  $\frac{1}{8}$  of an

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inch wide, and with an allowance of about  $1/16$  of an inch surplus. (Fig. 182 A.) Each end should then be slightly beveled *on one side* with a file, and the band then annealed and made in circular form, with the surplus end, designated by the nick, *overlapping the outside* of the other end until the nick approximates evenly with this edge. (Fig. 182 B.)

The surplus overlapping end must be on the *outside* to prevent diminishing the size of the band, and the relation may then be sustained by pinching the ends closely together with flat-nose pliers, which produces a sharp angle on each side of the joint. (Fig. 182 C.) This will usually overcome a change in the relation as the result of expansion when heated, though a wire may be twisted around the band for this purpose if necessary.

The joint should then be soldered with a *minimum* quantity of 25 per cent platinum solder, or pure gold, to prevent unnecessary stiffness, in the manner indicated.

The band should now be trimmed to follow the cervical curvature of the gum, the edge nicely *rounded*, and then fitted to the root, and afterward cut away until *as narrow as possible*, in accordance with the detail previously described.

**Floor.** The floor should be of about 32 gauge platinum cut somewhat larger than the diameter of the band.

The band should be placed in position on it, and first simply *tacked* to place with a small quantity of solder. This primary attachment secures the relation and *anneals* the floor metal so that it may then be easily burnished into *close* and *direct contact* with the edge of the band, without danger of changing the shape of the latter.

The soldering may now be completed in which, if pure gold is used, it must be carefully noted that perfect contact exists around the entire joint, after which the surplus may be trimmed away and finished down with file and disks until flush with the edge of the band.

**Dowels.** The dowel should be made of *round iridio-platinum wire* of a size proportionate with the size of the root and requirements of the crown, and fitted to the canal in the manner previously outlined.

The cap should now be adjusted to place on the root, the floor slightly perforated for the dowel at the proper point, and this perforation then *enlarged with the dowel* by forcing it to place. This insures a perfect contact between them which is essential to the strength of their union, and to the facility with which it may be accomplished.

The relation should now be temporarily sustained with gutta-percha or adhesive wax, until they may be removed, invested, and soldered as indicated. While any means of investment is often unnecessary because



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of the close relation thus existing, the simple means previously advocated for this *insures* their proper relation.

### **Accurate Fitting Dowels.**

Where it may be desirable to have the dowel fit closely to the walls of the canal throughout its entire length, the method suggested by Dr. A. O. Hunt, and others may be used to advantage. This consists in rolling platinum foil 1-1000 into a cone, passing this cone into the canal and expanding it first with a tapering pointed instrument, and then by packing cotton into it, until it conforms to the shape of the canal. It may now be removed and filled with *platinum solder*, and then adjusted to its proper relation with the cap, as indicated.

The same procedure is also applicable to any kind of crown construction, and for gold work the cone may be filled with scrap gold or solder.

While iridio-platinum wire of a suitable size will usually meet all of the requirements of a dowel, one constructed in this manner possesses the advantage of being *largest* at the *junction between crown and root* which is of course the weakest point in the attachment of any kind of a dowel crown; and the use of such a dowel may be especially indicated in these cases where the canal has become abnormally enlarged from decay.

### **Impression and "Bite."**

When the cap has been completed and finished, and adjusted to its proper position on the root, the usual impression should then be taken in plaster, and this *preceded*, whenever necessary, by a "bite" in wax.

After securing the impression, it should be observed that the cap rests firmly in place in it, and, if necessary, it should be sealed with hot wax. The interior of the band and surface of the dowel should then be covered with a thin film of melted wax, to facilitate its removal from, and admit of its accurate readjustment to, the model.

This is of paramount importance in this class of work, because of the necessity for frequently trying to place on the model during the construction of the crown, and particularly in those cases requiring a restoration of occlusion.

### **Facing.**

The facing should be selected in accordance with the requirements of color and size, and ground to conform with the desired shape and characteristics. As the color is more likely to be *slightly bleached* instead of becoming *darker*, if any variation is necessary or unavoidable, it should invariably be darker than lighter, though the best makes of porcelain teeth rarely change to any appreciable extent if the proper make and color of "body" is placed back of them, and properly fused.



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In this connection, it is necessary to use a "body" the fusing point of which will not affect the color of the facing, as an example of which the use of the higher fusing American "bodies" in combination with the English make of facings will entirely destroy the color of the latter.

In grinding the facing, the edge of the cap should previously be nicely *rounded* with disks (Fig. 183, A), and the cervical end of the facing then ground *thin* to admit of overlapping upon the labial or buccal edge of the band without causing undue prominence at this point. (Fig. 183, B.)

This is necessary as a means of bringing the edge of the facing into close proximity with the gum, and for the purpose of thus affording a *mechanical retention* to the porcelain with which this portion of the band should invariably be *completely covered*.

If the platinum band is not entirely covered upon this surface, it will always show through the thin transparent tissue, and occasion the presentation of a dark blue line, at this point.

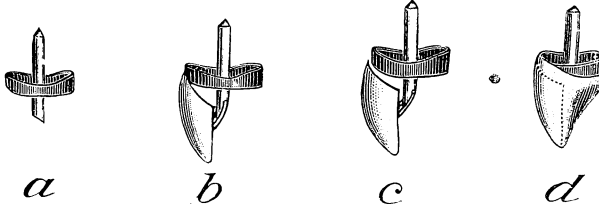


Fig. 183.

As this is a decidedly inartistic and *undesirable* feature, and as there is *no physical union between porcelain and platinum*, the overlapping of the facing affords a secure mechanical retention for a sufficient quantity of porcelain to cover this portion of the band and overcome this possible objection, and result in a smooth flush joint in the finished crown.

Wherever it is desirable to retain porcelain in contact with platinum, some similar means of affording mechanical retention is always necessary, and this may be further facilitated by allowing a very slight space to exist between facing and cap. (Fig. 183, C.)

When the facing has been thus properly adapted, it should be sealed to place on the cap with adhesive wax, and the whole then detached from the model and invested.

In investing, only enough material should be used to surround the crown nicely and afford sufficient strength in the investment; and when the material has crystallized, all surplus should be trimmed away until the *entire lingual surface of the facing is freely exposed*. (Fig. 184.)

## Investment.



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This free exposure is necessary as a means of facilitating the soldering, and it may be made without increasing the danger of fracturing the facing, if the case is then *adequately heated* before attempting to solder.

Before heating the case *the pins should be bent down toward the porcelain* until their ends may be brought into *absolute contact* with the metal parts. This may be done by holding the facing firmly in place with a blunt-pointed instrument in one hand, to prevent displacing it, while another

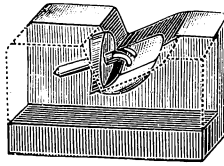


Fig. 184.

instrument, held in the other hand, may be placed against the *extreme ends* of the pins and sufficient pressure applied to bend them into the desired relation.

While it is always desirable to get the pins *down close to the facing*, and thus make more room for the porcelain, and still have an equal degree of strength in their attachment, this is especially indicated in the construction of anterior crowns.

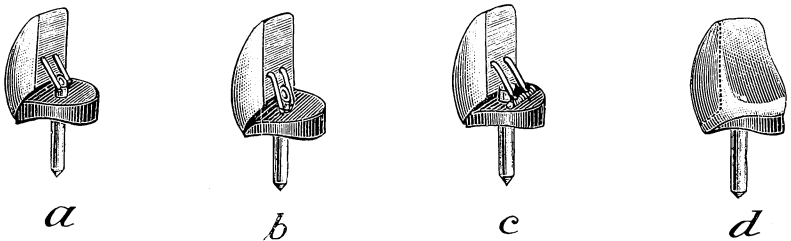


Fig. 185.

In these crowns the pins should be bent down close to the porcelain, and their ends brought into contact with the surplus end of the dowel at a point as close to the floor of the cap as possible (Fig. 185, A), or in direct contact with the floor itself. (Fig. 185, B.)

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This is important, because it affords opportunities for the same degree of strength in their union with the cap, and yet adds to that of the crown by getting the metal parts out of the way, so that they will not *divide* the porcelain through the center, or interfere with the proper and desired contour of the lingual surface.

In cases where the ends of the pins will not reach to the floor, or dowel, the space between them and the floor, after being bent down toward the porcelain, may be filled in with one or two thicknesses of platinum plate, or wire, if necessary, until *continuous contact* may be secured, as illustrated in Fig. 185, C. The finished crown, showing the possibilities of contour, strength and artistic effect, is illustrated in Fig. 185, D.

As there is no physical union between porcelain and platinum, in the construction of bicuspid crowns, it is not only desirable to make as much space for the porcelain which is to form the entire lingual surface of the crown, as possible, but it is also often necessary to provide some means

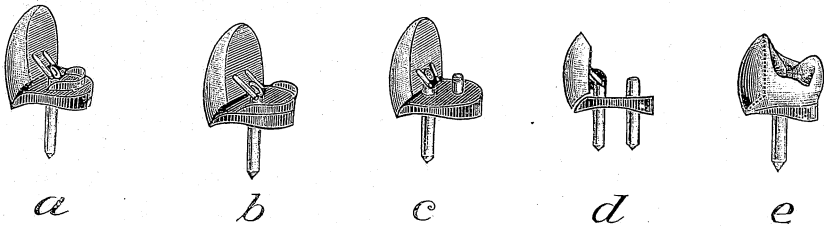


Fig. 186.

for supporting it against any possible line of *cleavage*, in order to preclude subsequent fracturing of this mass of porcelain from the stress of mastication.

This support to the porcelain, and destruction of the line of cleavage, may be best and most easily accomplished by soldering a narrow band of platinum to the floor of the cap, about one-sixteenth of an inch *inside* of the edge of the band. This *should be fitted before heating the case*, and may be attached at the time of soldering the facing, and its presence thus forms a cup-shaped support which admirably answers the purpose for which it is intended, without showing through, or materially weakening, the porcelain. (Fig. 186, A.)

Another means of accomplishing the same end has been suggested by Dr. Capon, and consists in adapting and attaching a band around the



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*outside* of the entire lingual surface of the cap, from one side of the facing to the other, and projecting about one-sixteenth of an inch beyond the floor. (Fig. 186, B.) This method retains and supports the porcelain in a splendid manner, but is much more difficult to adapt, and detracts somewhat from the artistic effect obtained in the finished crown.

The same result may also be obtained by attaching a small vertical extension of *round* platinum wire to the *immediate center* of the lingual portion of the cap. (Fig. 186, C.) Or, when two dowels are used, the surplus end of the lingual one may be so employed. (Fig. 186, D.)

Unless in the latter instance this is somewhat difficult to hold in its proper place while soldering, and may prove an element of weakness instead of strength, if not properly adjusted. When this procedure is

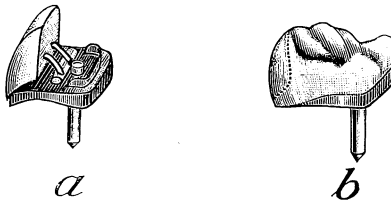


Fig. 187.

observed in either instance the extension of wire should be in the *exact center*, not project over one-sixteenth of an inch beyond the floor, and the extreme end always well *rounded*. The finished crown is illustrated in Fig. 186, E.

**Molar Crowns.** In the construction of molar crowns, *two* methods are employed. One consists in using a facing and observing similar details to those indicated in the construction of bicuspid, and the other in making the cap, and building the entire crown of porcelain without a facing.

**With Facing.** While it is true that the requirements of color are not quite so important in molars, the best results will usually be obtained from the use of a facing whenever possible, for the reason that both the form and color of the visible parts of the crown are obtained and preserved in the facing.

When a facing is used, the construction should be made, as indicated for bicuspid crowns, and illustrated in Fig. 187, A, and Fig. 187, B shows the finished crown.

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## Without Facing.

In very close "bites" the use of a facing may often be contraindicated, and the best results obtained by simply making the cap and forming the entire crown with porcelain. For such cases the porcelain should be supported by any of the means indicated, the variations of which, together with the finished crown, are illustrated in Fig. 188.

Additional mechanical means for obtaining, or aiding in, the attach-

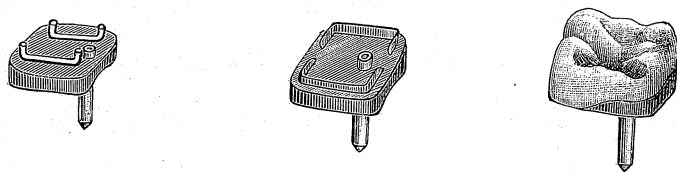


Fig. 188.

ment of the porcelain to the cap may also be secured in any of these various styles of construction, by *roughening* or *spurring* the surface of the platinum with a sharp-pointed instrument. This latter method is employed exclusively by some, and may serve the purpose in large crowns, where considerable surface is exposed, without being supplemented by any of the former means.

(To be continued.)





## Orthodontia from the Standpoint of the Student.

BY ANNA HOPKINS, D.D.S., St. Louis, Mo.

*Read before the American Society of Orthodontists, at Philadelphia, Pa., Oct., 1902.*

The subject of my paper, as printed in the programme, is a misnomer. For me to undertake the discussion of orthodontia from the standpoint of the student, the *real* student, the searcher after orthodontic truths, would at least be very presumptuous. But orthodontia from the point of view of the undergraduate is a very different matter, and just at this time when so much is being written and discussed on this subject by the teacher and the practitioner, a word from the so-called dental student might not be inopportune.

Of course, earlier or later, most of us have been students in dental colleges and know from actual experience all the various sensations and emotions produced by its study (as taught), and its practice (as demonstrated), in our respective schools. Yet things not constantly brought before our minds are apt to fall off the hooks of memory, and teachers seem to forget that the precepts which now slip so glibly from their tongues, and the demonstrations that look so easy when performed by their deft fingers, were once as difficult for them as for the youths who now stumble through recitations on subjects which they often do not comprehend, and who awkwardly burn their fingers in trying to solder with precipitated chalk for a flux.

When a young man determines to enter the lists as a dental student his choice of a school, I think I may safely say, is in no case made with

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reference to whether orthodontia is or is not made a feature of this school, nor indeed as to whether it is taught there at all. It is, in fact, extremely doubtful whether he even knows the meaning of the word, and if he notices it in looking over the course of study in the college catalogue, he is glad to observe that that study, whatever it may be, does not come until the senior year. If he has ever heard of the "correction of irregular teeth" it was probably in the discussion by his family and the neighbors of some local case where months of the most intense agony was suffered during treatment, terminating in a case of nervous prostration or even typhoid fever, or at least where all the teeth "went back," or fell out, or decayed, or met with some other dire disaster as soon as the appliances were removed, the whole operation being scathingly denounced and the victim said to have been served exactly right for presuming to interfere with the plans of Providence.

He has troubles enough during his first year in school. What with carving bone teeth, or modeling clay teeth, or turning out wooden teeth, products, not infrequently, that Nature in her most generous mood would never recognize as copied from her designs; taking modeling compound impressions and making models; shaping base plates; grinding and setting up teeth; packing, investing and vulcanizing and having the plate come out under-done or over-done or porous; casting dies and counter-dies; making all-metal plates; hours spent in the chemical laboratory making not-understandable tests for almost unheard of metals, and for compounds wholly unknown to him; hours in the histological laboratory spent in preparing and staining specimens, and in a mad and almost vain effort to learn the difference microscopically between tongue and fauces, spleen and kidney, lung and thyroid gland, striated and heart muscle, to be sure of red blood corpuscles and the structure of the liver; preparing for weekly or semi-weekly quizzes in general anatomy, and dental anatomy, and physiology, and osteology, and prosthetic dentistry; and last, but far from least, struggles over that horror of horrors to the Freshman student—dissection, the young man finds no time nor takes any interest in the murmurings or mutterings or mutinies of upper class men over any of their trials and tribulations, and certainly not over anything so vague and inconsequential as this orthodontia, *unless* he happens to have unusually marked and noticeable malocclusion, when he is likely to be inveigled by some ambitious senior into having appliances put on his teeth—usually to the present sorrow and discomfiture of both.

His second year is just as crowded with work as was his first, but in most schools even the junior student sees and hears practically nothing of orthodontia, or, in the event of his being required to make "regulating appliances" this year, or, more rarely, to take the lectures in this





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branch, he has no interest in the work for already he has learned the status of orthodontia in the school; already he knows how lightly it is regarded—how unimportant it is thought to be, and feels that time spent in even listening to the lectures is time wasted. This time spent in putting in gold fillings he thinks would be infinitely more to the purpose and in keeping with what he is there for. During this year he “finishes” the greater part of his theoretical work, learns various methods of making crowns and bridges, often spends much time in learning, or attempting to learn, to make various alloys and amalgams, and in testing the latter for edge strength, flow, shrinkage, expansion, etc., learns to prepare cavities for filling, and in many schools devotes at least the latter half of the term to actual clinical work.

It is with a feeling of considerable satisfaction in having overcome many obstacles that he enters upon his third year's work. He thinks he knows a great deal about dentistry now, and with the experience of the coming year feels that he certainly ought to be competent to undertake almost anything in a dental way. While he is presently to discover that really he has many more things to learn than he probably now knows, it is no doubt true that up to this point he has had good and practical teaching; that all has been done for him that teachers can do under the conditions existing in our dental colleges today; that he has been started in the right direction and that his further development must come through his own efforts, his own mistakes and successes, his own experiences. His teaching in what we may term “general dentistry” began two years prior to this and has advanced logically, step by step, to this point. Prosthetic dentistry was not taken up and finished the first year, crowded in with anatomy and physiology, chemical and histological laboratory work, etc. Operative dentistry (together with the manufacture of the tools and instruments necessary to its performance), was not taken up and disposed of the second year. No. They were taken up logically and proceeded by a natural evolutionary process to this the third year where they are blended into a practice as nearly like an actual office practice as it is possible to bring about.

But we pause on the threshold of the third year to find that with very few exceptions not one word has as yet been taught on the subject of orthodontia, a branch of dentistry that has proven itself to be at least as great as either prosthetic or operative dentistry from the fact that those few men who, finding their combined practice uncongenial, impractical and undesirable, have abandoned the successful practice of general dentistry to take up orthodontia as a specialty and have made of it their greatest success.

Here is our student who this year is to perfect himself in the prac-



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tical work of preparing and filling all sorts of cavities with the various golds, amalgams and cements; of diagnosing and treating an almost endless variety of pathological conditions of the oral cavity, including dying, dead and putrescent pulps, abscesses both chronic and acute, pyorrhea alveolaris, tumors, etc., etc.; of extracting teeth; of making and fitting partial and complete artificial dentures; of making and setting plain gold crowns, and Logan crowns, and banded Logan crowns, and Richmond crowns, and all-porcelain crowns, etc., with the same or greater variety of bridges—certainly a most stupendous undertaking—and yet in addition to all this he is expected to complete *this year* not only the theory and practice of orthodontia, but in nearly all schools, to manufacture the very appliances he must use in the treatment of his cases. And when we consider that at this time he probably cannot even give the normal occlusion of the teeth, which is to orthodontia what the alphabet is to literature, we can form some conception of what an impossible task confronts him. No faculty would expect even the most exceptional student to learn in a single school year all that he should know in order to begin the practice of operative and prosthetic dentistry, and yet it is not the exception for them to expect all, even their most inferior students, to perfect their knowledge of all other branches of dentistry, and in addition to learn all of orthodontia in nine months, or oftener less.

If the student had been taught when he was studying dental anatomy in his freshman year that **Importance of Knowledge of Occlusion.** occlusion—*normal occlusion*—was the basis, the very foundation stone, of not only orthodontia, but of all dentistry, he would, if he must wait until his senior year for the remainder of his orthodontia work, have at least laid the correct foundation for the structure he must build. If he had been taught in the beginning that the normal occlusion of the teeth was the underlying principle of every operation he would ever perform in dentistry, he could not have failed, be he never so dull, to have seen the application of this beautiful truth all through his practical work, and as his mind developed and gained a firmer grasp on the subject from Nature's point of view—the jaws and teeth as a perfect whole—he would have seen the beauties of occlusion in all the minute details of his work, in his treatments for preserving the teeth, his fillings for restoring their perfect contour and incising or masticating surfaces, and in his crowns and bridges for preserving space and restoring occlusion after extraction of teeth, and dentistry must then inevitably have at least a more scientific meaning to him than it could possibly have without this knowledge. Then in the mouths in which he performed these operations any teeth in malocclusion would not only be apparent to him, but he could not fail to recognize the im-



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portance of having them placed in normal occlusion, although he might not yet know how to do this. But he would, perhaps unconsciously, be studying orthodontia all the time.

But he is not taught the normal occlusion of the teeth in his freshman year, nor in his junior year, nor even in his senior year (except, possibly, in exceedingly rare cases). So when he undertakes the treatment of a case of malocclusion he does not know what the trouble is, nor how it is to be overcome, nor with what end in view. He only knows that the teeth are crooked and that some form of regulating appliance must be adjusted to move them into an arched form. He has only a vague idea of what appliance to use, of how to adjust it, and of how to operate it after it is adjusted. But he does know, after a short time, that it makes his patient's teeth very sore and that the patient is very nervous and irritable; that he has great difficulty in keeping the appliances in place; that at almost every visit of the patient some portion of it is either loose or out of the mouth entirely; that it usually does not move the teeth he wishes to move and that it does move the teeth he does not wish to move, and that when he discovers this he has no idea of how to overcome or correct it; that the patient always comes when he is all tired out or very busy at other work and cannot be coaxed, threatened nor bribed to keep regular appointments; and that he receives practically no encouragement, but only discouragements all the way through, with rarely even success at last to crown his really honest efforts. When he discusses the subject with his classmates he finds that their experiences are very similar to his own. He is thoroughly disgusted with orthodontia and vows that it is one kind of dentistry with which he will have absolutely nothing to do when he gets out into practice. He denounces it as a fraud, a snare, delusion, stumbling-block, and gives small credit to the reports he hears and reads, of successfully treated cases.

The really sad thing about it all is that he takes these impressions with him when he goes out to his practice, and every student who goes out with this feeling towards orthodontia, and there are few who do not, is another clog to the wheels of progress of this great science.

But the trouble does not lie with the student. He went to college to learn dentistry and at his graduation he is to some degree excusable if he thinks he knows the greater part of all that is worth knowing of the subject. The great central truth—occlusion a knowledge of which would illumine the whole path of orthodontia and ignorance of which leaves it "without form and void" is still there, as it has always been, like the law of gravitation, but if the student is not taught it and to see its application he cannot be blamed for not knowing it. That he can and does learn to do other dental operations without knowing occlusion he has demon-

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strated; that he can do them better, knowing occlusion, he will doubtless yet demonstrate; but that he cannot learn orthodontia without knowing occlusion is indisputable, for without it there can be no true orthodontia.

We have endeavored to show what an exceedingly busy life the dental student leads and how full must be his every moment if he would get only what is barely necessary out of his brief college course.

**Faults in Teaching of Orthodontia.**

• We have further endeavored to show how very busy he would still be were no work in orthodontia whatsoever required of him. All the work is so hurriedly crowded and jammed into three short years that that thoroughness in every detail, so essential to nice and accurate work is simply out of the question. This is true of all the branches taught, but that some are more neglected than others is also true, and that orthodontia is the one most universally neglected is undeniable. No other branch is left to be studied as best it may at the last minute. For other branches of work the very finest instruments, carefully selected, are thought none too good, and with these students are required to provide themselves. No student would use and no teacher would expect him to use chisels, excavators, pluggers or other instruments of his own manufacture, and yet those regulating appliances that he himself makes are generally the only ones he has to use in his orthodontia work. For the work of all other branches of dentistry conveniences such as rooms, chairs, cabinets, fountain cuspidors, blow-pipes, vulcanizers, soldering and work benches, mallets, forceps, etc., are provided by the college, but there is no provision made for the orthodontia work either in the clinic or in the laboratory. Indeed in attempting to do any work in orthodontia in a dental college it has sometimes seemed as though every possible hindrance was thrown in the way of the student and that help of any sort was denied.

Is it with this in mind that the National Association of Dental Faculties has added another year to the prescribed course of dental study? Has it at last awakened to a realization that heretofore orthodontia has not been justly dealt with, and are preparations now being made to give it at least an equal chance with other dental branches by providing for it more time?

At all events, if orthodontia is ever to be lifted to a higher plane, if the truth concerning it is ever to be generally known, there must be made some radical changes in its teaching.

First, as has already been said, the principles of occlusion and their application must be taught and taught early in the course. There must be provided a place in which to teach and demonstrate orthodontia technique, *including* the proper taking of impressions and making of



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models. To see a student endeavoring to carry on a course of treatment with no models of the original condition of his case is a pitiable sight. This laboratory should be separate from the others because it requires entirely different fittings and furnishings. The tools and instruments of the orthodontia laboratory would be not only useless but in the way in the general laboratory, and *vice versa*. This part of the course might well be conducted during the second year. Next very properly might come the work of classifying cases from models provided for the purpose by the college, and a little later the study and diagnosis of actual clinical cases, impressions, of course, being taken and models made of each case, and the study of the case not limited merely to the irregular teeth, but extended to include, first, the relations and extent of the maldevelopment of the jaws; second, the condition of the nose, nasal passages and throat as to whether it be physiological or pathological; and third, the extent of the abnormal development of the face as dependent upon the malposed teeth. And being thus thoroughly rooted and grounded in the subject he can begin the treatment of practical cases in his fourth year with some hope of success. When cases are presented for treatment he will realize what is wrong, know what is necessary to be done and how to do it, at least theoretically. He will have sufficient time so that one or two afternoons of each week can be given over entirely to the treatment of his orthodontia cases and he will not have to contend with the confusion and discouragement incident to attempting to combine the two classes of work.

Such a course of study for orthodontia, or one something similar, would at least give it its dues, and students an opportunity to learn it at least as well as the other dental subjects. If, after some experimenting, it were found that only a comparatively small number of students had any especial interest in the work, that to the majority it was irksome, arduous and not to their liking, the last year, the year of treatment, might be made optional, those desiring to perfect themselves in the work being given special privileges, and those to whom it did not appeal excused from the work altogether.

It is a rule, almost without exception, I believe, that in any class who study orthodontia those members who are at all interested and who can show any kind of successful results are among the very best students in the class and very few in number. This fact, together with the almost infinitesimal percentage of orthodontia specialists in the dental profession leads to the belief that it may never, no matter how carefully and thoroughly taught, appeal as a branch of practice to the mass of dentists. And herein unquestionably lies the greatest chance for a bright future for orthodontia. As one part of general practice, either individual or com-

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posite, it could only be advanced in proportionate ratio to the advancement of the whole, but separated from general dentistry, detached from it, it becomes the all-excluding center for concentration of thought and work, and may grow, expand, unfold in every direction, unhampered, untrammelled, unencumbered by that mass of other work which can never lift it up, but can only keep it down, and of which it is at best only a distant relation.

### Discussion.

Being a teacher of orthodontia I am unusually  
**Dr. Brady.** interested in this extremely valuable paper. I appreciate the principles set down by the writer and I agree with her to the fullest extent. During the years of my struggles to teach orthodontia properly, I have met with every difficulty described by the writer in presenting this matter properly to the student. I have met with the difficulty of improper rooms; insufficient time; and lack of facilities of every sort. Most of all, the indifference of the students, which comes only from very great ignorance of the subject. I have struggled along the best I could, hoping today to do better next year, and have naturally been led into examining the methods of teaching orthodontia in other schools. I find that they have all suffered the same difficulties, except that they are greater in number and worse in condition. I am not surprised that the ordinary practitioner feels that orthodontia is a nuisance and a burden upon him. If he were to receive no better instruction in crown and bridge work than he does in orthodontia, no more time devoted to it nor better facilities provided for it, he would consider crown and bridge work as big a fraud as he does orthodontia; and if he had no better instruction in filling teeth he would be no better a practitioner of operative dentistry than of orthodontia. I feel that aside from the lack of time, the lack of apparatus and the insufficiency of teaching that is given in orthodontia, one of the greatest drawbacks toward its success, both in teaching and in practice, is the fact that the student is taught to dabble with regulating appliances. There is no more excuse or reason for a dentist to make his regulating appliances than to make his entire outfit of instruments. Regulating appliances are merely the instruments with which he carries on his work, they are not the end of his work, they are mere sideshows to something which is infinitely greater.

I consider the paper very good in every detail. The question of how and what it will ultimately grow to is one which we could most profitably discuss. Whether the addition of one year more to the college curriculum, and the additional attention orthodontia will then receive, will do anything, remains to be seen. I think it should be taught as a





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specialty. When that time will come remains to be seen. I am very glad to express my hearty concurrence with the sentiments of the paper.

**Dr. Kirk.** I thank you very much for the invitation to speak on this question. Unfortunately I did not hear all of the paper. I came in late and only heard

the closing portion of it. I hope it may not seem presumptuous to speak on this question before a body of specialists in this important department of our work. But I am glad to say something from the point of view of the teacher, because I do happen to have some relation to the general subject of dental education, and I must say very emphatically that I cannot agree with the position of the essayist with reference to the condition of orthodontia teaching, at least in so far as my experience as a teacher is related to that subject.

I quite agree with her, as we all must agree, that the wonderful impetus which has been given to this branch of dental science by the recognition of the importance of occlusion as a central fact from which all these variations start, as given by our distinguished president has given a new life to the subject and systematized it, and it is a magnificent example of the potentiality of a principle which once enunciated, goes on and carries out its perfect work until it is completed. We knew nothing of orthodontia as a science until Dr. Angle presented this principle to us clearly and definitely.

The essayist will pardon me—I don't know her personally nor in what relation of life she exists, but it seems to me that it is one of two things, that she has either been acquainted with a school that is careless in this matter or has based her statements upon observations made a number of years back before this principle began to have its effect upon dental teaching.

I want to say that in the school with which I happen to be connected, and also in others that I have examined, and I hope that this society does not claim that the question of occlusion is restricted in its application merely to the question of orthodontia, that it is taught that the principle of occlusion is at the very foundation of dental practice. We teach the principle of occlusion at the very beginning of the dental course, as the foundation of prosthetic work, of operative treatment, and we consider a man is not fit to go ahead with his practical dental work until he is well grounded in a knowledge of the individual teeth, their forms and the relationship of the several forms as manifested by complete normal occlusion. They must know that before they are fit to go ahead with their operative work or any other branch of dentistry. So occlusion forms the foundation of our teaching in the first year. I do not claim that we are offering a perfect system of technical education in

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occlusion, but I do claim that we recognize the importance of the principle and are endeavoring to enforce that principle as the basis of our technical course.

There is another feature with which I want to agree in what has been set forth in the paper, that the specialist in orthodontia will be the outgrowth of natural selection, so to speak. In teaching it becomes evident very soon that certain men will, by reason of their natural tendencies and tastes, elect certain departments in which they will specialize, and it becomes the part of the teacher to furnish opportunities for the development of these men in specialties.

I agree with the paper as to the fourth year. I stated at the meeting of the Dental Pedagogic Association at Pittsburg, that I felt that the early part of the course should be based upon the idea of furnishing instruction in all of the foundation principles of dentistry, and that the fourth year should be given largely to elective groups, in which orthodontia in its practical application will take a very important place; there should be an opportunity given to develop specialists, but we should not require the average student to take the fine details in orthodontia which we would require of the specialist.

I trust that the dental profession at large understands that the dental institutions can only go so far. There is significance in the name which we give to the termination of the course in dental instruction—Commencement Day. It is literally commencement day. The most that any dental institution can give to any man is to direct him in the road of study, to give him a point of view, so that thereafter he can go on with his real education. That, to my mind, is as much as any institution can do, set him right on his professional pathway, giving the fourth year to specialties and in the three preceding years laying the foundations of all that relates to the practice of the science in which we are interested.

Here I think is a subject for extension of learning.

**Dr. Grevers.** The position I fill in the University at Amsterdam is a broad one and I have to go over every branch; so I give the students an idea of what is normal and abnormal occlusion. You cannot expect students to be proficient in every branch. They should be instructed in the general principles and then leave what they want to acquire especially to special schools.

I would be glad to add to the paper if I could,

**Dr. Lourie.** but on the whole the essayist has stated the case about as I see it. As I understand the essayist's intention, it is to intimate that the dental schools do not as a rule give enough attention to the subject, and that the information given by them



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is not as it should be at present, and instead of giving so much detail in the matter of constructing appliances, the schools should give more of the fundamentals of dental study—of occlusion and the requirements of occlusion in association with the facial lines and development of the face, etc.—so that on the whole I can have nothing to say in the discussion of the paper other than approval, with the exception that the essayist may have been a little too emphatic in the denunciation of the course as at present given, but it may be that she has given the conditions found in some of the colleges that are less careful in the course of instruction. Otherwise I would heartily approve the sentiments expressed.

I desire to commend Dr. Hopkins on this paper.

**Dr. Easto.**

In my experience and observation not only with colleges but with dentists and with students, it has invariably been the same; they do not understand occlusion. It was not taught and is not taught properly in most of the colleges. I believe there are some in which occlusion is properly taught. A great many men are being graduated each year who do not understand occlusion. We might just as well take the medical student and give him a few lessons in anatomy and send him out as a physician. The surgeon who does not understand anatomy is just as poorly equipped as the dentist who does not understand occlusion. Something will have to be done whereby this branch of dentistry will be more thoroughly taught.

I do not think the essayist meant we all should be specialists. I agree with Dr. Kirk as to making the fourth year elective. We want to teach the students enough orthodontia so that when they go out to practice they will appreciate what this branch of dentistry is. If the student in medicine knows enough, when graduated, about rhinology and ophthalmology to know that he cannot practice them in connection with his general medicine, he knows that he will not practice them at all, and that is what we want of the dental student in regard to orthodontia.

I don't know whether Dr. Brady referred to the school in which I teach, but I blush in the dark when I think of the things I told last year. These crude methods are still being taught in some of the institutions. Why is it that the student gets lost and feels that he does not understand orthodontia? It has been very well outlined in the paper. It may not be true of some colleges; I will make an exception of Dr. Kirk's college.

**Dr. Kirk.**

With reference to the fourth year, I did not mean to convey the idea that orthodontia should be excluded from the preceding three years at all, but that the fourth year should be devoted to specializing this work.



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**Dr. Angle.**

I cannot let this opportunity pass without saying a few words on this very important subject. I was a teacher some fourteen years at dental colleges.

During that time I was connected with four different schools. I came in contact with a very large number of students and I tried just as hard as I could in every way to interest them, freshmen, juniors and seniors. I would talk orthodontia to them, always trying to get enthusiasm; trying to get the management of the schools interested so that they would give orthodontia something like a fair show which I always felt it ought to have; but I believe that most of those long years of very arduous work were largely a failure. The boys would be very enthusiastic at first, all would be specialists the first week; the second week but a few would be specialists, and the third week you would see their coat tails going around the corner when orthodontia was mentioned. I did not blame the boys very much for that; there were many conditions that led up to that. They did not know the importance of it and their minds were not developed to an appreciation of its great possibilities for good. They had so many other things that the time was crowded out, and worst of all, they never had any conveniences. If the schools grew, and they usually did, the room we had appropriated one year was taken up the next by the extra number of chairs, etc., and orthodontia was always being crowded more and more to the rear. I saw I could only teach them a mere smattering and could never carry them along far enough so that they would be sufficiently interested to go on by themselves. They got a smattering of it and went out with that sort of hidden understanding that they knew it all. Any one who has ever examined students in orthodontia knows very well that there is only a small percentage of them who would amount to anything if you taught them thirty years. They are not artists; have not that innate judgment and ability to cope with the changes that come about with each case daily. The conditions are changing daily, temperaments, and types and pathological conditions all modify this so that there are a very few who will make a success of it.

I have studied boys carefully and think it is the height of absurdity and almost criminal to compel boys who have no liking or ability for it, to go blundering on and pass an examination in it and then turn them out, blushing to acknowledge that they do not know all about it. You see the results of what they are doing all over the country.

**Dr. Watsing.**

I think Dr. Kirk misunderstood the sentiments of the paper. The author did not mean to convey the impression that there were no schools teaching

occlusion, but she did say there are very few, and I would like to emphasize it; there are exceedingly few.



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Some exception has been taken to the mechanical phase of it. I have had some little experience in consultation work, and men have come to me who have been taught by some of the most eminent instructors, men who could do most beautiful mechanical work, and yet they have brought models and told me they had been working on cases a year and a half and two years without succeeding in producing widening of the arch or the rotation of a tooth.

If the time spent in hammering out different appliances and trying them, making nuts and screws and so on, while in college, had been spent in the study of occlusion alone they would be better orthodontists. They thought it required a distinct appliance for each tooth, and in making one or more movements, they had to have a different appliance for each direction. There is no need of a great massive volume of pages and distinct appliances; they could be described in a very small pocket edition.

With regard to Dr. Grevers's statement that we are overcrowding the students, I believe that. I believe in the high schools, in the grammar schools the students are being overcrowded, but my experience with dental students is that there is very little danger of overworking them, but to provide for that emergency, with a fourth year added, let us hope that just a little of that time will be devoted to teaching orthodontia, and teaching real orthodontia and not how to run machine shops. Dr. Grevers said it was impossible to teach all the various branches of dentistry. I agree with him, but would Dr. Grevers in his school graduate a man who intended to practice merely operative dentistry and not teach him prosthetic dentistry? I think not. We must not graduate men who do not have some knowledge of orthodontia, although they will not all be orthodontists. I hope not, but I do think it is necessary that the student should be taught the true principles of orthodontia and that they should have some little clinical experience, for the reason that the people who are so fortunate as to live in our large cities are able to secure the services of specialists; but think of the thousands of people located in small towns who will not and cannot support an orthodontist. Must they go without such services? If they cannot have the best, give them the best they can get. It is the same in medicine, if the general practitioner of medicine knew nothing in the way of surgery we would have to turn the world into a cemetery. We should teach men the vital principles of orthodontia. Most of them would be able to do something, and could refer their more difficult cases to specialists. I plead earnestly for the teaching of true orthodontia, to a degree that will enable the student to give good advice if they do nothing more and that they are not doing now. The advice of the average general practitioner is awful; ninety-nine times out of a hundred I believe radically wrong. Why? Because he



does not know anything about it and he knows not that he does not know.

**Dr. Grevers.** I do not think that I made myself clear. I meant to convey the idea that the student should be taught every branch each by its own professor. If there were five or six examiners and every examiner wanted the student to be excellent in his department, no student would pass the examination; so I mean to say they should have special teaching in every branch. They should have the elements, but they cannot be taught everything; it would take a lifetime and he would be old and gray-haired if he understood every part of dentistry to perfection. I have been for twenty years one of the Board of Examiners in Holland and I have often noticed if a student was excellent in diagnosis he was a poor operator, and *vice versa*, a good operator was a very bad diagnostician. I think in a college of four hundred students only three or four would be excellent orthodontists. This must all be taken into account in teaching students. We must not expect of a young man that he be proficient in everything.

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## Nasal Occlusion and Septal Deviation in Their Relation to Antral Development and Facial Expression.

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By ROYAL S. COPELAND, A.M., M.D., Ann Arbor, Mich.

*Read before the American Society of Orthodontists at Philadelphia, Pa., Oct., 1902.*

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In preparing this paper your writer has taken it for granted that any material bearing upon orthodontia or heterodontia\* will be of interest to your society. The blanket title assigned by your secretary is almost as comprehensive as the blanket charters granted under the laws of certain States, by the terms of which a corporation may engage in anything from silver mining to ping-pong. The truth is, there is so much to talk about in this connection that it is embarrassing to feel the restraint of a set subject. I do want to remark, however, that you orthodontists have a most attractive field of labor and in your specialty are performing wonderful feats.

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\*Mal-position of teeth. Word coined by the author.—Ed.



## ITEMS OF INTEREST

### **Orthodontia and Rhinology.**

It is difficult for one whose thoughts are usually turned in other directions and who has personal acquaintance with very few of your profession, it is difficult, I say, to know how fully you appreciate the relation between your specialty and that of the rhinologist and laryngologist. This intimate relationship and the interdependence of the specialties are the two things which make me tug at the halter of a fixed title. This intimacy is not alone a matter of neighborhood relation, but dates back to a common embryological development. It will be remembered that the naso-frontal process, which enters into the formation of the intermaxillary portion of the upper jaw, also has an important part in the formation of the septum and bridge of the nose. The palatine plates, too, in that they form the roof of the mouth and the floor of the nasal fossæ, are common to your specialty and mine. Furthermore, certain morbid conditions of the nose and throat produce evil results in dental development and some forms of heterodontia are responsible for deviations from the normal in the organs looked after by the rhinologist and laryngologist.

### **Etiology of Malformation.**

One cannot make a critical study of deviation of the nasal septum and malocclusion of the teeth without being struck by the remarkable parallelism of the two conditions. Both appear at the same age, they are frequently found in the same patient and, in my opinion, have much in common etiologically.

Placing all the deformities of the nose and mouth into one class and considering them as different expressions of a single condition, it is interesting to theorize a bit as to the causative factors responsible for these unsightly deviations from the normal facial lines. Every such case, of course, arises from causes congenital or acquired. Of all the cases, those due directly to congenital causes are the least common. But, to make a proper classification, it is necessary to include in the congenital forms certain cases which are due to nasal or postnasal diseases, themselves the natural result of congenital causes. In this, I refer particularly to such cases of septal deviation or malocclusion of the teeth as accompany adenoids or tonsillar hypertrophy. This question will be dealt with more at length in another place.

### **Embryological Origin of Facial Deformities.**

The embryological origin of many of these deformities has been overlooked by most writers. The reason for this is quite apparent. Most congenital defects of the head, for instance coloboma of the iris, hare-lip and cleft palate, are expressions of arrested development which are apparent at birth. Other abnormalities recognized

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as congenital in origin appear very soon after birth. Septal deviation and the various deformities grouped under the general term of heterodontia, in most instances, do not become apparent until the seventh or eighth year. Naturally, therefore, the possibility of congenital origin is overlooked and a less remote cause is sought.

Unfortunately, I have not at my command all the literature bearing on this question. Danziger, a Continental author of importance, has written exhaustively concerning the malformations of the palate and their relations to the nose, eye and ear. The *Monatsschrift für Ohrenheilkunde*, No. 1, 1900, has an abstract of this article and it advances a reasonable theory for many abnormalities of the nasal, superior and inferior maxillary bones.

Before considering this theory it is well to recall some embryological facts. Embryology, as you know, is a science which is yet in the stage of development. Fortunately for us the parts of the head in which we are interested at this moment are among the settled portions of the science. Perhaps these problems are not so thoroughly solved as to be numbered among the "Eternal verities," but for all practical purposes they are settled.

I agree with my friend, E. D. Reed, who includes in the science of embryology, not only the changes which are completed in utero, but also the processes which begin at that time, even though they are continued through infancy to early adult life. The foundation of Danziger's theory is one of the processes normally incomplete at birth, but associated with changes strictly embryonic.

It will be recalled that at the base of the skull the embryonic head has several, eight to be exact, separate and distinct bones. These fuse during early life and the total number is divided by two. The thing of special interest to us is the fusing of the baso-occipital and the sphenoid. Normally this takes place in early adult life, actually it undoubtedly occurs much earlier in many people.

Too early fusion at this point impairs the growth and development of the base of the skull. It shortens the space between the foramen magnum and the base of the nose, at the same time impeding the growth of the maxillary bone. Danziger contends that in consequence of these phenomena the palate is pressed upon from all sides with the result of a high, pointed palatine vault. This in turn encroaches upon and narrows the nose and nasal pharynx.

Granted that this is true, and it looks reasonable, the deflected nasal septum is the result of causes which may be traced directly to an embryo-

## **Congenital Malformation.**



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logical source. The shortening of the baso-cranium may be a cause, too, for a deficiency in the growth of the orbit with consequent involvement of the eye. It throws light on the deafness in deaf mutes. A disturbance of the aural cavity with an interference in the growth of the tympanum causes such impairment in shape and function as is found in deaf-mutism.

Danziger's theory is attractive and it appeals to me as worthy of tentative acceptance. It explains why a face, which in infancy and early childhood is symmetrical and attractive, becomes massive in its upper half, and diminutive in its lower half where its growth is impaired by accident of development. It does not explain all of the cases of septal deviation or dental malposition. It does not account for the majority of them perhaps, but it does explain the cases of heterodontia occurring in children free from nasal and throat diseases, children who have been well and healthy from the time of birth.

### **Acquired Malformation.**

There are cases of malocclusion and septal deviation which cannot be explained on this hypothesis and yet, as I have said, they might with all propriety be classified as congenital. I refer to the deformities resulting from nasal, postnasal or pharyngeal disease which in itself is congenital in origin. The immediate cause, however, for the facial deformity in such patients is exactly the same as would produce such a deformity after traumatism or acute disease. To be more explicit, it makes no difference whether the nasal occlusion, for instance, be due to adenoids or to cicatricial contraction following a burn. Therefore, I will consider the remaining possible etiological factors in facial deformity under the head of acquired causes.

### **Mouth-Breathing.**

No matter what may produce the nasal occlusion, it is the mouth-breathing, chiefly, which has to do with the change in the facial expression. Reference to your authors shows this to be a threadbare subject. You have already discussed, pro and con, the action of the buccinator. In passing, you will permit me to say I have fancied the human anatomy has been somewhat amplified and embellished by a few of your writers in an attempt, apparently, to force a conclusion not altogether justified by the ordinary dissections. But it is undoubtedly true that the hanging lower jaw, and the action of the facial muscles upon the plastic alveolar process has much to do with the development of the heterodontia.

### **Psychic Phenomena.**

Many children have habitual facial expression as a physical manifestation of certain psychical influences. It has been noticed for years that diseases attacking certain regions of the body manifest themselves by certain lines or furrows in the face. In abdominal disease, as for instance gastro

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enteritis or even chronic gastric irritation, there is found a distinct furrow beginning at the ala of the nose, passing downward and curling around the corner of the mouth. In disease of the lungs or air passages there is a line from the angle of the mouth, running outward to be lost in the lower part of the face.\* These lines are the result of unusual muscular force habitually acting in one direction. The symptom of pain felt by the little patient is manifested in this way. It is conceivable that mental conditions from other causes may result in fixed expressions. The distribution of force by the action of the muscles in the happy, changing moods of the child and the placid expression in sleep are lost. The unequal distribution of muscular effort probably has its effect upon the alveolar process. Therefore, psychical influences must be counted as one of the possible factors in the production of heterodontia.

It is important to know whether or not the bone itself is influenced by the movement of the teeth. If it is, Dawbarn's theory† is worthy of consideration. He says the pull on the adherent faucial pillars, in enlarged tonsils for instance, influences the

dental arch, while the disuse of the nasal passages in mouth-breathing produces negative pressure there. Acting together these forces would cause the vault of the mouth to rise and tend to point the dental arch. Septal deviation and malocclusion would result.

The fact is, however, that careful measurements of Dr. M. T. Watson's models show that in the reverse process, i. e., in the correction of the deformity, the roof of the mouth is unchanged in position. These models, showing as they do most wonderful changes in the breadth of the dental arch, reveal no change in the height of the vault. In the light of my present experience and observation I believe that wonderful, plastic, supporting tissue, the alveolar process, is alone affected by the pressure, be it accidental from muscular action or intentional from the appliances of your specialty. Septal deviation, then, is not to be expected as a result of malocclusion from most acquired causes.

Did time permit it would be interesting to consider the possible relation of failure of local nutrition to the malformations under discussion. Some other writer may touch upon the differences, in structure, origin and development, between the maxillary bone, cartilaginous originally, but ossified in embryo, and the alveolar process, membranous, really sesamoid in nature, not permanent, serving its day and generation and dis-

\*Eustace Smith, *Disease in Children*.

†*Phila. Med. Jour.*, July 8, 1899.



## ITEMS OF INTEREST

appearing. The influences of some underlying dyscrasia or diathesis is another point worthy of thought. I am content, however, to leave the subject here and let another finish the incompleated work.

There is one other topic to which attention **The Maxillary Sinus.** should be directed for a moment or two. The title assigned me gives license to consider at some length the relation of the antrum to facial expression. The development and growth of that sinus, however, has so little to do with the change in facial lines, that trespass upon your time for that discussion would be unwarranted. The popular idea is so counter to this statement that it may be wise to say a word or two in defense of the proposition.

Between the middle and inferior ridges, which later become the turbinated bodies, about the tenth week of embryonic life there occurs an evagination of the ectoderm into the maxillary process. The result is the formation of the maxillary sinus. This change is a peculiar one. It is an actual hollowing out and destruction by ectodermic tissue of an otherwise solid bone. We can think of it as a sort of normal or physiological malignancy. The process is not complete until early adult life, but the peculiar way in which the antrum develops explains why there is no change in the external face. It is not a swelling or inflation of the maxillary bone, but a resorption of its interior. Under normal conditions, then, we need expect no change in the facial lines by reason of antral development.

Unfortunately, the maxillary sinus is not always **Relation of the Antrum** normal in development or condition. In fact it is **to Malformations.** more commonly diseased than the most careful writers of a few years ago supposed. Your own Professor Cryer and doubtless others of your profession have called special attention to the importance of observing the state of the nasal accessory sinuses. It has remained for Grünwald, Herbert Tilley and one or two other investigators to determine the far-reaching evils attending nasal sinusitis.

In chronic empyema of the antrum that sinus becomes a reservoir of pus which overflows into the nose, passes into the throat and is swallowed. Septic conditions affecting the entire system are sure to follow. This result is to be expected, but there is another effect of sinus involvement which until lately has been almost entirely overlooked. I refer to nasal polypi. Where they exist, in practically every case the primary disease is located in one or more of the sinuses.

In summing up the relation of antral involvement to heterodontia, let me call your attention to a kind of "house that Jack built" sequence: Diseases of the antrum may result in nasal occlusion, nasal occlusion is

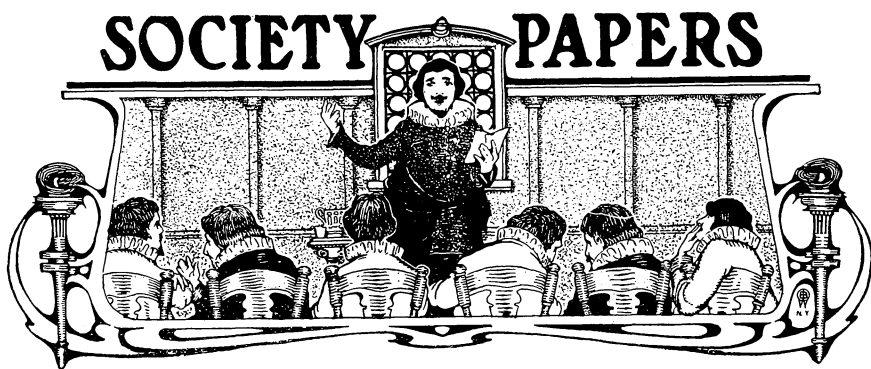


## ORTHODONTIA

attended by mouth-breathing, mouth-breathing may be followed by displacement of the teeth. To use another figure this sequence may be looked upon as a "Round-robin." It begins with a diseased tooth causing antral disease and ends with the orthodontist treating an effect directly traceable to a dental cause.

I am tempted to continue, but enough has been said to show that these two specialties, yours and mine, are so intimately related that for either of us to neglect the other is to cause the failure of both. We certainly should adopt as our slogan that old familiar motto, "United we stand, divided we fall." The dentist has helped me out of many a tight place, and if my specialty can serve the orthodontist I shall rejoice and be glad.





## **Empyema of the Antrum of Highborne.**

By DR. FREDERICK C. COBB.

*Read before the Boston and Tufts Dental Alumni Association, October, 1902.*

Empyema of the antrum is a somewhat hackneyed theme and I fear I shall tell you many things you already know as well or better than I.

It is only on looking backward over the last ten years or so that we realize the improvement in methods of diagnosis and treatment that have resulted from the work done on this subject. It will be interesting and instructive to look back and see what those changes have been.

It is not difficult to understand why disease of the antrum was overlooked up to twenty years ago. The characteristic symptom of empyema is a nasal discharge, sometimes foul but always purulent and in most cases unilateral. This was set down to the credit of the catarrh and every one was satisfied and the discharge went on. Sometimes, however, owing to polypi in the nose or within the antrum itself, the small passage leading from the sinus into the nose became obstructed and acute pain followed by redness and swelling below the eye or lip became apparent. The abscess, unable to discharge through the nose, had made its way through the bony wall and discharged through the face. The surgeon drained the antrum through the cheek, curetting out the interior of the cavity and packing, or as Miculiz recommended, destroying the nasal wall be-

low the lower turbinate and throwing the abscess into free connection with the nose. Then it was that the antrum acquired the reputation which it has never since lost, the reputation of a cavity which is most difficult to heal. For in spite of drainage, in spite of every antiseptic known (and it seems to me that almost all of them have been tried on the antrum), the cavity resolutely refused to heal.

If we read the account of the earlier surgeons, how bone after bone of the wall was removed until little but a sinus remained and yet healing did not result, we do not wonder that the antrum obtained this reputation which nevertheless is quite undeserved. We were told by all the earlier writers that the anatomical situation of the antrum, with its opening into the nose situated at its highest point, like the little window at the top of the old-fashioned dungeon cell, was unfavorable to drainage and that to be properly drained it must empty at the bottom. At first sight this seemed reasonable, yet an antrum under favorable circumstances healed within a few days. This we found by experience, but how can we reconcile fact and theory?

It seemed reasonable enough after we began to realize that a human being, unlike a dungeon, is not always in the same position; that, in fact, for one-third of his life he is in a recumbent position, with the outlet of his antrum in the best position to drain it. Such a simple explanation seems unnecessary, but you have only to look over any text book and you will find many such statements as that quoted, pass without contradiction. I have said that the older physicians were not unfamiliar with acute forms of antral empyema, but the subacute forms were unknown to them.

The advent of the laryngologist and the nasal speculum produced quite a new state of things. In the attempt to cure a nasal discharge, the first question suggesting itself was the origin of the discharge. It was found that frontal, anterior ethmoidal and posterior ethmoidal cells and the sphenoid all pour their secretions into the nose and that all these cavities are subject to empyema.

Differentiation by the location of the pus in relation to the middle turbinate could be made between the frontal and anterior ethmoidal which emptied below the middle turbinate and the others mentioned, the posterior ethmoidal and sphenoid which discharged above. The diagnosis of these cavities still however presents great difficulties and we are only beginning to study them as they deserve.

The antrum, however, owing to its greater accessibility has received more attention. Voltolini first drew attention to the illumination of the antrum by electric light placed in the mouth and this has been of great service. By the aid of this, with the fact of a unilateral discharge,

**Diagnosis by  
Antral Illumination.**



## ITEMS OF INTEREST

we are enabled to diagnose pus in the antrum. His opponents argued that the bones of the face differ as much in thickness as the antra themselves vary in size and that therefore the light will vary with these conditions. My experience is that if one gets a nasal discharge on one side without any visible reason in the nose, and darkness on the same side combined with clearness on the other, he can feel very safe in diagnosing antral empyema. The darkness in antral suppuration is not due to the presence of pus in the antrum but to the thickening of the mucous membrane which results from the presence of the pus. This can be easily proved by washing out the antrum and then transilluminating again, when the cavity will be found to be as dark as before.

But empyema of the antrum means the presence of pus only, it does not mean necessarily that the inflammation arises in the antrum. And this fact brings us to a further and most interesting discussion. Very few years ago we all supposed that pus in the antrum meant an inflammation of the antrum itself, but a curious case which occurred here in Boston, threw a different light on the subject. A patient of a prominent laryngologist here was sent for antral empyema to a well known dentist. The dentist removed a second molar and washed out a large quantity of pus. The antrum filled up again and again and finally after a year of washing the patient went to New York where Dr. Bosworth saw him and found an ethmoiditis, and after curetting and burring in the ethmoid region in two or three sittings succeeded in curing him. No treatment was directed to the antrum.

This case suggested at once, of course, that the antrum was in some manner dependent on the ethmoid and might have served as a reservoir to it. To establish this point I removed the anterior wall of the frontal sinus in the cadavers at the Harvard Medical School and injected ink, tilting the head from one side to the other and found that on opening the antrum of the same side, the cavity was stained with ink. Dr. Fillebrown had proved the same point by his excellent investigations with the probe passing it from the frontal sinus to the antrum and to him belongs the credit of the discovery, although his article had not been published at the time of my experiments. By the proof of the connection of the antrum with the ethmoid and frontal sinus, it became at once evident why so many cases of antral disease had not been cured. We were draining and cleaning the reservoir while the polluted brook which led to it was still pouring its filth into the wound. Of course, any antrum which is full of pus will give the same signs on transillumination and the same discharge of pus as one in which the purulent process started *de novo*. These experiments showed why it was that antra had failed to heal under

all the radical measures directed against them by surgery. To prove that the antrum does not deserve its reputation as a difficult cavity to heal, was left to other clinical data. A few cases will illustrate, I think, that the antrum will heal with great rapidity.

**Cases of Rapid  
Healing of Antra.**

J. L. entered the Boston Dispensary complaining of a foul discharge from the left nostril. Transillumination showed the antrum on the same side dark; pus was seen under the middle turbinate and examination of the anterior wall of the antrum showed a small sinus leading upward. This sinus was cut down upon and a tooth removed, which Dr. Edward Briggs assured me was a twelfth year molar. The boy was twenty years old and had had the discharge two years, he said. After the removal of this tooth, an opening remained so large that a slate pencil could be passed into the antrum.

The antrum was washed once or twice and within a week all subjective signs of an empyema of two years' duration were gone and did not recur.

The same result was true of a doctor's wife operated on by Dr. Maurice Richardson. Many times I have seen the removal of a tooth result in complete cure in a few days. Foreign bodies in the antrum, other than teeth, are capable of inciting it to empyema and I have records of a case of gutta-percha injected through a tooth root in which the antrum recovered promptly, although the duration of the suppuration covered two or three years. It seems evident to me from the cases cited and others that the antrum is not only not a cavity obstinate in resisting cure but one which heals with great rapidity if given a fair chance.

But, it may be objected, "these are cases wherein foreign bodies are found in the antrum, how is it about diseases of the cavity itself?" That the antrum when clogged with pus from the ethmoid may heal, the case cured by Dr. Bosworth, already cited, clearly shows. Idiopathic inflammations, that is, inflammations resulting in empyema not caused by foreign bodies, teeth, obstructions to the orifice by polypi and syphilis, do not occur in the writer's opinion. I know this statement will be challenged, but I do not feel that it can be successfully done until we can show a goodly number of cases absolutely cured by treatment directed to the antrum alone.

**Necrotic Bone  
in Diseases  
of the Antrum.**

As a result of the last few years then we may say that the antrum is a cavity with a natural tendency to heal; that it is frequently not the seat of suppuration, but the reservoir for other sinuses and that its tendency to suppuration is in most cases due to the teeth or allied foreign bodies. It will be noted that in the cases cited where the antral



## ITEMS OF INTEREST

empyema had lasted many years, no mention was made of necrosed bone. In fact, necrosed bone is a very rare factor in the large majority of antral empyemata. And here again we find ourselves at odds with the earlier physicians who seemed to find it much more frequently. There are, however, two kinds of antral empyema in which necrosed bone plays quite a part, syphilis and new growths of the antrum. So common is it in these two forms and so rare in the simple, that its existence should make the physician fear that he has a more serious case than he had suspected. Fortunately for the diagnosis of these conditions, syphilis and sarcoma or carcinoma rarely restrict themselves to the antrum alone, but send prolongations upward into the nose if they are new growths, or destroy the nasal wall or turbinates, if the disease be syphilis. Another appearance which should always lead to investigation is any swelling in the walls of the antrum. Simple empyema never produces a painless swelling of walls outer or inner of the antrum. Malignant growths, carcinoma or sarcoma will always be so in time, since the long and steady pressure acts on the walls to cut off their blood supply and the wall is slowly and almost painlessly absorbed.

From a diagnostic standpoint we have then, so far, simple empyema, caused by teeth, foreign bodies, disease of the upper sinuses and malignant growths.

Within the last few years a comparatively new **Dentigerous Cysts.** affection, frequently confounded with antral empyema, has appeared. Dentigerous cysts arise, as you know, about the tooth roots and slowly dilate the tissue at the root of the tooth. In a dozen or so of such cases at the hospital, some very interesting forms have been encountered.

Dentists, as well as surgeons, have been misled by this curious disease into a diagnosis of antral empyema. It is not unnatural, for the face presents a swelling over the antrum, extending in some cases as far as the orbit. The tumor is hard, for its outer and inner walls are bony. It generally covers the canine fossa which is often quite obliterated and the tumor starts from a little above the level of the teeth. It seems as though the whole bony wall of the antrum were thrust outward and forward and there is none of the soft boggy appearance of an abscess in the soft tissues covering the antrum. Transillumination sometimes gives a darker, sometimes a similar appearance to that of the sound side. There is one symptom, however, always absent, the unilateral discharge. If we look in the nose we find no pus, no swelling of the turbinates, nor any narrowing of the lumen of the nostril. Then if we study the history, we find that the swelling has lasted months or even years and that it is not accompanied by pain or fever. We know that pus imprisoned in the

antrum cannot force its outer wall forward without pain and fever and that so steady a pressure must push the inner wall of the antrum inwards, thus obstructing the nostril.

Two factors, compression of the inner wall and nasal discharge are wanting and so with some doubt we make an opening in the lower part of the canine fossa and introduce a probe. We at once find ourselves in a cavity as large as the antrum and the probe goes in nearly to the orbit. Again in doubt we syringe fluid into the cavity, but no fluid runs out through the nose. Therefore the cavity cannot be the antrum. The dentigerous cyst forms at the root of a tooth and dissects for itself a cavity in the anterior wall of the antrum so that the jaw contains antrum and cavity, one behind the other and often of nearly equal size.

A unilateral nasal discharge must accompany any antral empyema except that of the acute type in which the antrum is closed. Given this we must seek to separate the antrum from other cavities and place the responsibility for the disease on the antrum if the others are normal. This is not always an easy task and to accomplish it the dentist and the laryngologist must work together, each getting the benefit of the other's knowledge of his own territory.

As to treatment I have gone at such lengths into  
**Treatment of** the causes of antral empyema because no treatment  
**Antral Diseases.** is of any avail unless the cause is removed. Drainage, washes and antiseptics are all powerless to do more than make the patient comfortable. Diligent search for offending teeth is of the first importance and every root or cavity connected with a dead tooth must be explored. Even in toothless gums the X-ray has revealed roots which have caused empyema. Careful histories as to time of origin and comparison with dental troubles at the same time will often point the way. Rubber injected into the antrum through a tooth root and remaining in the antrum has caused the disease in one of my cases. The laryngologist should examine the accessory cavities with probe and light and only when every possible cause has been eliminated should the antrum be opened. When it is opened, however, the opening must be a large one and generally made in the canine fossa. An opening large enough to admit the finger should be made and the antrum examined by touch and sight. It may then be curetted and packed but in my opinion no drainage tubes need be introduced unless to make the patient comfortable. Any foreign body, such as a tube, will irritate the antrum and cure will result, if the cause is removed, better without than with them.

If the cause cannot be found the patient may be made more comfortable by washing his antrum out once or twice a day, but it will not heal. We require and are obtaining more careful and thorough examinations





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and operations in both surgery and dentistry and we need to work together. As dentists and physicians grow more expert, obstinate antra decrease and I believe by working together we can some day make persistent empyema of the antrum a disease of the past.

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### President's Address.

By Dr. F. P. HAMLET.

*Read Before Second District Dental Society, Oct. 13, 1902.*

We have been fortunate in having heretofore presiding officers with unusual qualifications, who have been a credit to this Society in the performance of their duties; whose grace, dignity and intelligence has lifted the standard of the presidency so high that now the mantle has fallen about me, I assume the obligations with some timidity and fear. I beg to assure you, gentlemen, that I greatly appreciate the honor you have conferred by making me the presiding officer of this Society, having in its membership gentlemen representing the best type of manhood loved and respected among us. It is my desire to perform the functions of the office with as much satisfaction to you as did those gentlemen who have preceded me.

The pressing responsibilities which fall to the busy and industrious man in this ever onward and progressive life confronts us again after the refreshing and restful days of the summer vacation. Man is affected by his environments as though he were one of the wild flowers of nature giving obedience to the magic of spring. He works with skilful hands ever developing, beautifying, restoring, comforting, until the petals of his endurance become, like the fading, drooping flower, fatigued; so that ambition and interest in his occupation relaxes and he seeks rest.

The wild flower, too, in obedience to nature, adorns herself with beauty, she blossoms to the delight of our eyes and perfumes the fields to the peace of our senses; when overcome with the burdens of her simple existence she seeks rest. Gentlemen, it is again the time in our onward march to blossom, to employ every faculty of our genius to build better than we have ever done before. We have had our rest, summer is gone, and we are absorbed again in our professional tasks.

A little snow, a little rain,  
A soft wind blowing from the west;  
And woods and fields are sweet again  
And warmth within the mountain's breast.



So simple is this earth we tread,  
So quick with love and life her frame,  
Ten thousand years have dawned and fled  
And still her magic is the same.

**The Dental Society.** Dental societies are organized for the purpose of advancing dental science and dental ethics. Essays and discussions form an important part of our society work. It is here we review new and ingenious appliances and formulate remedies to treat the diseases of which the dentist is more conversant, diligently striving to obtain the best to cure, repair and replace Nature's failures. A progressive dentist should be in hearty accord with such work, for it does so much for his profession and humanity. His interest must not end here even. A progressive dentist should look with favor upon any movement that will elevate the standard of his profession, for if we fall short of the high standard which has made us respected by other professions, then will we cease to be an example of intelligent educators, seeking to obtain the best and to do the best.

To be a successful practitioner, a dentist should be ethical. It is not necessary for him to be a society member to command the respect and esteem of a dental society, but a dental society member should rigidly uphold the ethics of his society, for they tend to refine our thoughts, our works and our associations as individuals. Our ability is judged largely by our conduct. I venture to say that dental ethics was in the minds of those gentlemen who organized the first dental society over half a century ago. The knowledge we have attained was a natural consequence of our associations with refined and intelligent thinkers. So, gentlemen, let me remind you that whatever the profession has achieved in the past, has been largely through the influence of our societies which have stood for the highest in ethical teaching and scientific attainment, and is also a bulwark against quackery and charlatanism.

Our work for the past year has been most satisfactory and agreeable; the officers and committees, likewise the entire membership have been harmonious and fraternal. We have made another good record, starting this thirty-fourth anniversary in a most prosperous condition. The work of the Executive Committee is the most diligent and attentive part of our official machinery. It aims to secure the leading men to instruct and edify. The discussions, which are recorded, form a very important part of our yearly literature.

**The Needs of  
Young Dentists.**

But, I would remind you, gentlemen, that while it is commendable, and very natural to desire essayists, who treat subjects relating to the newest theories and practice, I would suggest that for the sake





## ITEMS OF INTEREST

of our young members we lose not sight of our old standards which have been a solace to us, both in practice and theory. We must not forget that the new dentist, the young graduate, has been unable to absorb in his short college career many valuable practical ideas, which to the older society members may seem threadworn in discussion, but indispensable in his office. If we remember this, it will lessen some of the trials and graver responsibilities which waylay the young practitioner in his earlier experience. So, gentlemen, while we encourage the young men, and impress upon them the importance of engaging in society work, let us try to tell them some of these little things. I believe that there are many valuable contrivances hidden in our cabinets, or records of work accomplished both of a practical and scientific nature that would be advantageous to us if presented here under the head of "Incidents of Office Practice," and I urgently request of you, gentlemen, that you make special effort to have this part of our "order of business" interesting and profitable to all.

The work for this year has been skilfully and carefully outlined by our committee and everything promises another pleasant and fruitful season. The Executive Committee's task is no easy one. It is really the most laborious part of our society work, depending as we do upon it for all our material, and expecting so much, as we have a right to do, in competition with others in an advancing science. We must not, however, weigh lightly its real worth to us as a society, nor fail to recount at the close of our yearly meetings the benefit we have derived by its endeavors as individuals.

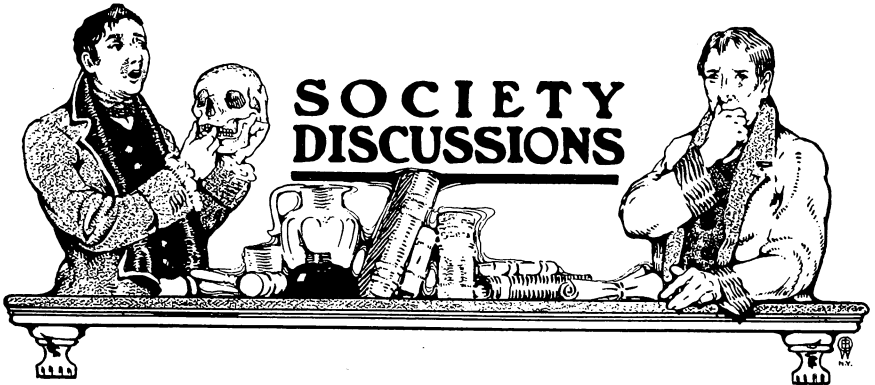
**Tribute to  
Dr. O. E. Hill.**

And now, gentlemen, in closing I wish to refer briefly to the death of our dear friend, Dr. Hill. It is painful to assemble here without him; he was so loyal to this society and to his profession. It seems but yesterday we were gathered about the "festive board" in his honor, to show our regard for him not only as a dentist of good reputation, but as a loyal and steadfast friend. We saw in him sterling characteristics. Characteristics which made him esteemed and beloved. The influence of his genial nature was not transmitted through any artificial rules of politeness, but generous wholesouled courteousness which begets kindness. His chief adornments were generosity and good nature. "His wit in combat so gentle and bright never carried a heartstain away on its blade." But he has gone "to that mysterious realm where each shall take his chamber in the silent halls of death" and we shall miss him. He has left to us the fruits of an industrious life, a good name and an honorable record.

In order to bring suitable resolutions before this society tonight I deemed it my duty to appoint a committee for that purpose to be known as the "Dr. O. E. Hill Resolution Committee." These resolutions will be

presented tonight for your consideration. This committee is composed of gentlemen who enjoyed Dr. Hill's close friendship for many years. I shall call upon them during the evening to address a few words to this Society in remembrance of our friend and our profession's benefactor. Committee: Drs. Wm. Jarvie, A. H. Brockway, T. A. Quinlan, F. T. Van Woert, R. Ottolengui and F. C. Walker.





## Boston and Tufts Dental Alumni Association.

### Discussion of Dr. Cobb's Paper.

The paper of the evening is so complete in its treatment of the pathology and anatomy of the antrum that it is unnecessary for me to attempt to add to it or modify it by discussion of that part of the subject further than to allude to the little I have had to do with calling attention to the connection of the frontal sinus to the antrum. The fact that a probe could be passed into the antrum, through the nasal foramen and into the frontal sinus has been demonstrated by Cryer, Brophy and others; and that a fluid injected into the frontal sinus would pass into the antrum, had been shown by Merkle many years ago; but the formation of the connection had not been described. I examined eight heads in the Harvard dissecting room and found that the infundibulum terminated in a pocket at the bottom of which the foramen opening into the antrum is situated. Consequently any discharge from the frontal sinus would pass down into the pocket, and, if the foramen was unobstructed, would gravitate directly into the antrum. Subsequently I examined fifteen more heads, all of which showed the same formation. In one or two the foramen was very large, fully one-half inch in diameter. The openings were not uniform in each case. In one was almost an absence of the wall, yet the antrum maintained a healthy condition. In one specimen I found absolutely no antrum, only a small spot where the cancellous tissue was a little coarser than that surrounding.

## SOCIETY DISCUSSIONS

**Transillumination.** In a recent article Dr. Hoople, of Brooklyn, mentions the fact that we may have pus in the antrum without special inflammation. He does not mention the antrum as a reservoir. His opinion is that the walls of the antrum would generally get well without surgical interference. Dr. Hoople is inclined to think that transillumination is not of any great importance in diagnosis of the antrum and that it cannot be relied on. I have not been able to derive much benefit from it. There is no uniformity in the sides of the face of the average patient. There may be one thick spot and many thin ones, so I do not think a diagnosis from the light is of much account. A report of a case I saw in the paper recently seems to the point. A patient had as he thought swallowed his artificial teeth and they had lodged in the aesophagus. He was subjected to the X-ray and the plate located. The surgeons proceeded to operate but found no plate. As they were sewing up the wound, a sister of the patient found the plate under the mattress of the bed where he had undoubtedly placed it in his sleep. Possibly if the surgeons had passed a probang before proceeding to operate they would have obtained a different symptom on which they could rely and would not have been controlled by the uncertain signs of the X-ray.

**Necrosis.** Many causes of the trouble were mentioned in the paper, among them necrosis. I think, as the gentleman has remarked, that dental troubles are the source of a large proportion of disease in the antrum, I should say perhaps more than seventy-five per cent, and most of this originates in alveolar abscesses. Necrosis, which is mentioned, is in almost every instance caused by alveolar abscess and abscesses of the teeth and should be considered one of the sequelae of the abscess rather than the original cause of the antrum disease. Foreign substances and inflammation resulting from a low condition of the system seem to include the remaining causes of empyema of the antrum. The fact that pus is so long and persistently secreted by the mucous membrane just inside the nasal foramen leads me to think that the inflammation if not at first started in the nose, is continued by proliferation from the nasal membrane.

**Cases from Practice.** There came to my clinic a few years ago a lady thirty-five years of age who had had a number of teeth capped. Abscesses followed causing necrosis of the alveolar wall from the right cuspid region to the left second molar. I removed the affected teeth and the necrosed bone. I found the surface of the antrum secreting a large quantity of pus. The case of course improved fast under treatment, but after a few weeks made less rapid progress. I maintained an opening into the antrum nearly one-half inch



## ITEMS OF INTEREST

in diameter, into which I could pass a probe wound with cotton without touching the sides. With this I explored the antrum, touching but one place at a time. By these means I found the lining membrane affected in the posterior apex. This place gave me a good deal of trouble and it took me a year to overcome it, which I finally did by applying once in seven to ten days 95 per cent carbolic acid. I maintained the opening by means of a hard rubber plug. The antrum has been entirely well for a long time now and the opening has been allowed to close up. The patient necessarily wears artificial teeth.

A young man, a stair builder by trade, was having intense pain in the side of his face which kept him from work and made him down sick. He went to a hospital and was operated on. After washing out the antrum the opening was allowed to close. After that he was operated on a second time with no better results. It was prognosticated that he would never be able to work again. He came to our clinic and we found a condition that amazed us, in that any surgeon could allow such a state of things to escape his notice. In the left upper molar region where the trouble originated, there were no less than eight roots of teeth and all of them apparently abscessed. Not a single root had been removed. When these were out of the way, we found a good sized opening into the antrum without any further operation. The antrum was washed out and packed, and in a few days he was back to work. There was one peculiar condition about this case. He had a good deal of pain which continued after the operation. This was relieved by packing and so for the short time he was under my observation he continued the packing because he was so uncomfortable without it. After that I lost track of the case and I cannot state what the final result was.

I have had lately another case in which there was acute pain in the left antrum with considerable discharge from the nose. It yielded very quickly to treatment and is now apparently well. I have not allowed the opening to close. In this case I am still in doubt as to the cause as the teeth all appear healthy.

I saw today another case of long standing referred to me by a throat specialist some two years ago, possibly more. She lives quite a distance from me and there was no one in the vicinity to treat her so it has not made the rapid progress that it might have had she lived nearer. I arranged it so she could irrigate the cavity herself and she has done so very faithfully. I saw it a year ago and it was much better than the year previous. Today it is much better than a year ago. The trouble now seems to be confined to the region of the foramen. The rest of the antrum seems well.

Another case I have now under treatment, referred to me by a brother

## SOCIETY DISCUSSIONS

practitioner, is of a man about thirty years old who has had trouble in his antrum about two years. He has had it opened twice and the opening maintained for a time by packing. As soon as the packing was left out the wound would close and in a short time the trouble return. I opened the antrum and inserted a rubber plug. His condition is already much improved.

**Simultaneous Diseases of Both Antra.** Trouble with both antra at the same time is not very common. I had one case recently, the patient being a physician. Exhibition of trouble in one antrum was followed by evidences of trouble in the other a short time after treatment of the left side was begun.

I have here a model of a similar case. The model is of the mouth of a patient of a professional friend of mine. Both antra were affected and were opened with such freedom that the openings remain and evidently can never close. It is made doubtful if she can wear an artificial plate. My friend wishes to know what can be done. I have replied that I think the openings can be closed by a surgical operation and after that she probably can wear an artificial plate.

**Small Opening Preferred.** I am aware that the trend of surgical opinion is in favor of a large opening such as the essayist has described and in the canine fossa or buccal region.

This is the main point on which I cannot agree with the writer. The opening in the canine fossa is not in the lowest point, consequently the drainage is not complete. If the opening is made so large as to be able to feel and see the interior of the antrum, we are too likely to have the condition just shown in this model, namely, a hole that will not close. I believe that everything can be gained in almost all cases by an opening through the floor of the antrum in the region of the first molar or the second bicuspid that can be gained by an opening in the canine fossa or buccal region and the danger of a troublesome opening avoided.

I use a trephine five-sixteenths of an inch in diameter. To maintain the opening I make a hard rubber plug, with a plate covering the opening, attached to the neighboring teeth by clasps closely fitted; this allows the edges of the wound to heal so that a probe wound with cotton can be passed up into it without touching the sides and a thorough topographical examination can be made and the condition of the antrum be perfectly well understood. I very much dislike a drainage tube however nicely it is made, for it allows a constant flow of pus into the mouth and I cannot say that I think it a desirable condiment, whereas if the pus is held back by a plug, which the patient can remove and insert without difficulty and with a rubber bulb syringe irrigate the cavity as often as may be needed



## ITEMS OF INTEREST

the annoyance is avoided. After the acute stage is passed, twice a day is all that is necessary. In case the mucous membrane has been inflamed for some time, and has become thickened and indolent, excellent results follow from packing with gauze but it should be kept up only until a healthy reaction is induced. The packing should be changed every day.

**Medicaments.** Boracic acid solution, four per cent, is in my judgment the best of all washes, but other similar remedies will produce good results. Active germicides, as bichloride of mercury and carbolic acid, are too irritating except in a case where deep ulceration persists when strong carbolic acid applied once a week in addition to the ordinary irrigation will produce the best of results. Even then it may take considerable time to overcome it, as in one of my cases referred to it took me nearly a year to make the last spot well.

There is really very little for me to say. I have  
**Dr. B. N. Strout.** certainly enjoyed Dr. Cobb's paper. The subject has been most thoroughly covered.

One thing which he mentions I wish to speak of, the reputation of the antral wall for healing. In old text-books, for instance, Garretson's Oral Surgery, the statement is made that an antrum ever opened will never close. By experience we find the opposite to be true.

Regarding use of electric light as a means of diagnosis. I find it reliable. To show well, it must be eight to ten candle power.

Dr. Cobb says an idiopathic empyema is very rare. In this connection I wish to mention one case. Pain was localized in an upper second molar. The pulp was found to be healthy. The tooth finally became very loose and was extracted. The antrum was filled with very foul pus. The cavity was thoroughly washed once and healed without further treatment. I agree with Dr. Cobb that a large opening into the antral cavity is to be preferred to a small one. It has the advantage that foreign bodies present may be found and removed more easily, and as a rule will heal as quickly and certainly as the smaller one.

I would not use a tube to keep the wound open. If pus is flowing through it will not close; at least that has been my experience.

Dr. Fillebrown has spoken of necrosis as a primary cause of empyema. I should say it was rather a secondary, as there must necessarily be some cause for the presence of necrosis.

In several cases of long standing which I have seen in consultation, my advice has been to try letting alone for awhile. Many of the cases have healed with no further treatment. I think in many cases the mistake is made of over-treatment. The treatment is the cause of the continuance of the trouble and not any diseased condition.



## SOCIETY DISCUSSIONS

If the trouble is from the frontal or ethmoidal cells, it will not heal, but if from the antrum itself, and the cause removed, it will usually heal with no treatment, not even washing.

I have not very much to say in closing this discussion. With regard to how large an opening should be made, I have one case only in which the antrum has healed but left a very large opening. I think I can say that every other case we have opened has healed and has surprised me by healing after so large an opening. The influence of a discharge of pus on the healing process of the opening is, I think, negative. All openings tend to close unless the case is complicated with syphilis or malignant growths in the antrum. As regards cure, no antrum can be regarded as cured unless both anterior and posterior nasal discharge has quite ceased, and we should always examine and assure ourselves that this is the fact lest we mistake quiescence for complete absence of discharge.

It is, perhaps, very much like bringing coals to Newcastle to exhibit palates to a Dental Association, but coals from any source are very acceptable at this time.

I cannot say very much as there is not time. I have been for a number of years making investigations in the way of preparing casts of palates of idiots rather than the insane. Those exhibited tonight are palates of idiots. I was led to make the investigation by the account of results obtained by Dr. Down about forty years ago when he was investigating the subject at his asylum. After examining two hundred he came to the conclusion that if there was a certain palate you might be sure you had a case of congenital idiocy. Ten years ago I began to make a collection of 1,000 casts. After a careful study of these casts I found my results were different from Dr. Down's; instead of the percentage of V-shaped or deformed palates being very large, it was much smaller than he and other observers had led me to believe. On the contrary, I found the majority of palates in imbeciles, altogether about 40 per cent, were of fairly good shape. This result has led me to say that it is very hard, as you know, to tell what is a proper standard. It has always been considered the horse shoe shape, but only in a small number was the typical horse shoe shape found. You will find in these casts all sorts and kinds and some deformed. Instead of adopting the horse shoe shape as a standard, I decided upon a modification of this shape, which I call the U palate, which has some of the characteristics of the horse shoe, but is somewhat narrower. I wish there were time for personal criticism of the palates I have brought here tonight. Of the V-shaped, of which you will see some very good specimens, there are 19 per cent; of the U-shape I got a percentage of



## ITEMS OF INTEREST

24 8/10; of the semi-V-shape 4 3/10; about 48 1/10 per cent of the palates, which are presented are V-shaped. There are also a small number of saddle-shaped palates. I compared the percentage I got with others gotten in this way and I found a much larger per cent of deformed palates than in the casts I have before me. Dr. Talbott, an enthusiastic investigator, found in school children nearly as many deformed palates as I have in these casts and yet we would not like to call them idiots because of this deformity. Dr. Clouston has examined a small number of idiots' palates and he gets a very much larger number than I do. He has a classification of his own: "Typical, neurotic and deformed." I think you would call that classification empirical rather than anatomical. Of the number examined (169) he finds 61 were deformed and 28 neurotic, and out of the entire number 11 which he calls typical. It is an important question to members of this Society to be able to furnish light upon this subject. We know that a great many writers are telling us that the shape of the palate is a stigma of degeneracy. I think this is overrated. I think malformation is a stigma in some other part of the body, but here alone not pathognomonic of degeneracy and a slight variation is of no particular importance. I think this is borne out by other investigators and the collection of palates which I show you. I have selected these casts at random and I should like to pass them around and hear criticisms and answer them. In the collection you will see all kinds of palates, some are very narrow and more or less V-shaped, and others very much scooped out and hardly representing the V-shape as I have given it. I think many deformities are due to dentition. The saddle-shaped are almost entirely due to the way the teeth come in.

Another point I think very important, that the palate of the idiot is apt to be more or less of the juvenile type. An idiot twenty or thirty years old will sometimes have a palate like a child of nine to fourteen years of age.





Matter intended for publication should be addressed to the  
EDITOR, 80 W. 40th St., New  
York.

## EDITORIAL

### "I Did That Ten Years Ago."

Not infrequently has it occurred at dental meetings that some one, most often a young man, will present the full details of a method which he has found useful in his practice; a method entirely original with himself. Presently an older man rises, indorses the method fully, and then states that he has been doing it for at least ten years.

It is patent of course that such a claim may be either true or false. If true, two separate conditions may exist. The method may long have been known to the older dentist, and it may even have been published, yet the younger man may never have heard or read of it. In such a state of affairs, why deprive him of the little pleasure of supposing that he is imparting useful knowledge to his fellows for the first time? Why should not the older man be generous enough to sit still and allow the little fellow to have his day? It is rarely a worthy impulse which leads men to claim prior knowledge on such occasions. At best it is selfishness. In a few instances the older man may not only have had previous knowledge, but from experience he may have learned that the method is unreliable, or faulty, in which case it would be permissible for him to make such statement and record his experience. But these are the exceptions.

Then there is another possibility. The older man who rises to claim





## ITEMS OF INTEREST

priority in regard to the supposedly new method, may in point of fact be really the originator, and yet have never published any description of his method, that others might have the benefit. In such cases if credit is given at all, it should be accorded to the younger man who freely showed a disposition to share his knowledge with his fellows, rather than to the older man who kept the secret so long for his own private uses.

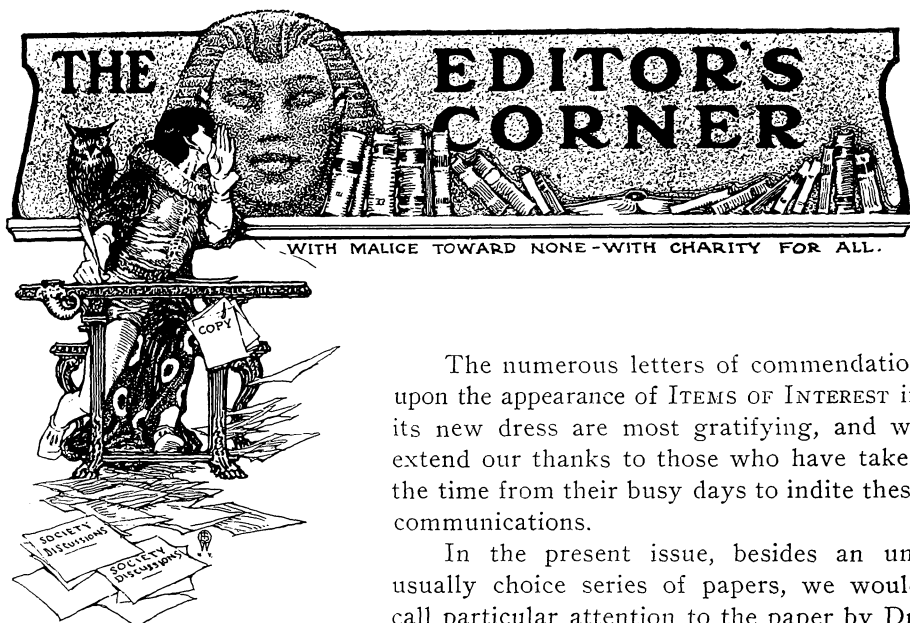
In natural history, when two men claim priority as to the discovery of a new species of animal, the rule is that credit be given to the man who first makes publication. Even though the claimant may be able to show manuscript descriptions of the species which actually antedate the capture of the specimen used by the later man for his published description, his claim is not allowed by the rules of science, because he had failed to publish.

So should it be with those who seek credit for discoveries in the realm of dental science. Unless he can cite publication of his alleged discovery, such man should be ruled out of court with his belated claim.

Then again there is another aspect. Why should men seek credit at all? As a rule the true scientist, the man who works for the betterment of his profession, receives all credit that he may merit without claiming or seeking such recognition. It is therefore a phase of self aggrandizement that leads one man to say, "I did that;" a second to exclaim, "Yes, but I did it first;" and a third to screech, "Why! I did that ten years ago"

What of it gentlemen? Suppose one of you has just made the discovery, which the other two of you have known and practiced for years; what matters it to science which of the three of you can bawl the loudest and so get the greater credit? All three of you will "die and rot, and be forgot," while the method will live, if live it should, and be of use to your fellow practitioners and your fellow man. Should not that knowledge suffice you while you live, even though your names be not mentioned to the patients whenever the method be utilized.

Last there is the highest, noblest view of all. The man working with no thought of self, seeking no credit nor public thanks for what may be the results of his labors, and having reached some high achievement, eager to make known at once the new fact which he has dugged from the ditch of the unknown, or the new method which he has formulated, lest by keeping it to himself even for a brief period, the progress of his beloved profession be retarded. Such men as these, let us be thankful to say, are within our ranks, and their names are household words where dentistry is known. Yet no one of these was ever heard to raise his voice seeking credit for his works.



The numerous letters of commendation upon the appearance of *ITEMS OF INTEREST* in its new dress are most gratifying, and we extend our thanks to those who have taken the time from their busy days to indite these communications.

In the present issue, besides an unusually choice series of papers, we would call particular attention to the paper by Dr.

Davis in which we think we have presented to us the most lucid exposition of the Bonwill method of arranging artificial teeth ever published.

**Dental  
Manufacturers'  
Exhibit.**

A novel event, of interest to the whole dental world, is announced to take place in Philadelphia, March 17 to 19 inclusive. Heretofore the show of dental goods has been a feature of meetings organized by dentists. On this occasion the reverse methods are presented. The manufacturers of all classes of goods used by dentists have arranged to hold an exhibition of their own, at Horticultural Hall, and they invite the members of the dental profession to be present. A feature of marked importance will be a series of clinics, whereat practical demonstrations will be made to show the methods of employing the various wares introduced. There is little doubt that clinics and exhibits of dental goods are always attractive to dentists, so much so indeed that at dental meetings it is always necessary to have the exhibits closed during the readings of papers and discussions, as otherwise half the men would remain away from the meeting room proper. At the style of exhibition now to be inaugurated nothing of this kind will interfere with the full examination of all that will be on show. It may be said that this will be the first real dental exposition, from the manufacturers' standpoint, ever known.



## ITEMS OF INTEREST

### **Use of Talc for Carving Teeth in Technics.**

Prof. J. P. Gray, Dean of the University of Tennessee, desires to suggest through the pages of ITEMS OF INTEREST that in porcelain technic work colleges should use talc, in the third and fourth grades. He states that in his college they have been using talc in preference to bone or ivory, as it can be cut easily with the pocketknife and is not brittle. The students carve teeth and prepare cavities. Undercuts, shaping of marginal walls, etc., can be thoroughly demonstrated.

### **Treatment for Putrescent Pulp Canals.**

In connection with the treatment of canals, Dr. F. W. Stephan writes as follows: "In the treatment of abscesses and of root canals generally I have found the following mixture most serviceable. Take of oil of cloves and carbolic acid crystals, equal parts. Melt the carbolic acid crystals by heat and add the oil of cloves. This mixture is easily prepared and possesses in marked degree the desirable qualities of the essential oil—carbolic acid mixture. If used with reasonable care it will not discolor the teeth in which it is placed.

### **Dental Practice in New Zealand.**

Dr. D. H. Jennings, writing from Oamaru, New Zealand, says: "This town of about 5,000 population has from its earliest days been supplied by chemists who only drew teeth. So the majority of my patients only ask for extraction as a rule. The filling, crowning, and conservation of the teeth is run down as "a dentist's dodge" for perpetuating his business, though, of course, a few educated people form an exception. Young ladies applying for artificial teeth particularly request that they shall be small and white. With many, even young persons, I find the lower alveolus absorbed away at a very early age, making substitution particularly difficult."

### **Beta-Eucain.**

In a brochure on "Local Anesthesia and Its Application in Dentistry" (Leipsic, Arthur Felix, 1902), Dr. Herman Thiesing, Royal Court Dentist, discusses the twelve anesthetics which have been used in stomatology. He finds that aconin, cocain, Alpha-Eucain, holocain, orthoform, and orthoform-new are less suited because of their greater toxicity; nirvanin, anesin, etc., because of insufficient anesthetic action and other disadvantages; and that beta-eucain should be employed. Dr. Thiesing has also used Wilson's anesthetic, but has entirely ceased to employ it, having become convinced that better results are obtained with a 1 per cent Beta-Eucain solution; moreover, Wilson's anesthetic is 15 times as expensive as such a solution.

Beta-Eucain possesses greater anesthetic power than tropacocain, while the duration and intensity of the anesthesia, and the area affected



## EDITOR'S CORNER

by it, are equal to that of cocain. Besides being three and three-fourths less toxic than cocain, beta-eucain possesses the important advantage that its solutions can be sterilized with boiling. The author has never observed oedemas or subsequent pains from the use of boiled beta-eucain solutions, though sometimes, just as with tropacocain, bleedings followed its employment, which, however, have always stopped promptly without aid.

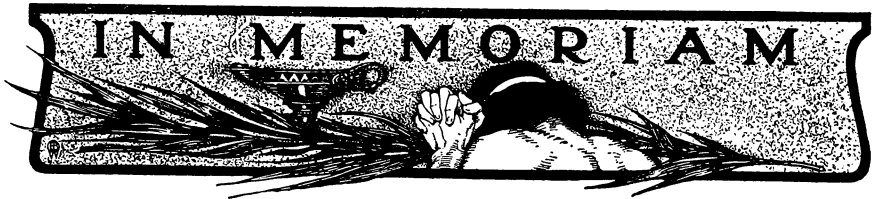
Insensibility of the mucous membrane may be easily produced by the external application of a beta-eucain solution. The injection of a 1 per cent solution (to which eight-tenths of 1 per cent sodium chloride have been added) at body temperature is absolutely painless and effects a thorough anesthesia lasting 25 or 30 minutes.

From his investigations Dr. Thiesing draws the conclusion that in dentistry only beta-eucain and tropacocain may be considered, and occasionally, if very dilute solutions are to be used, or for application to the unbroken skin, also acocain and cocain.

He himself prefers beta-eucain, because it is less toxic than tropacocain and has considerably more anesthetic power. According to the investigations made by various physicians, a 1 per cent beta-eucain solution produces about the same effect as a 4 per cent tropacocain solution. The possibility of intoxication is therefore much greater with tropacocain.

Dr. Thiesing considers it advisable to employ beta-eucain solutions of four different strengths for various purposes. He indicates *2.5 per cent beta-eucain solutions* for opening abscesses, excising small tumors, extracting loosened (not inflamed) teeth and roots (deciduous teeth) and the four lower incisors, and anesthetizing the nerv. alveolar infer. on the lingula and on the foramen mentales; *1 per cent beta-eucain solutions* for extracting the upper incisors, bicuspid and molars, straightening teeth by operation, drilling the alveola, and removing necrotic root apices; *2 per cent beta-eucain solutions* for extracting the lower molars and bicuspid and the four canines, excavating sensitive dentines, and extracting the pulp; and *3 per cent beta-eucain solutions* for extracting all teeth and roots in acute periodontitis.





## **Dr. O. E. Hill.**

### **Report of Committee of Second District Dental Society.**

The committee appointed to prepare resolutions upon the death of Dr. Hill would report the following minute:

Died, June 2, 1902, of Bright's disease, at his home in Brooklyn, New York, Dr. Orville Ernest Hill. Dr. Hill was the son of Erastus Montgomery and Pamela Keeney Hill and was born October 2, 1832, at Tioga, Pennsylvania. He was of revolutionary stock, his early ancestors being from Connecticut and his two grandfathers having served in the war for Independence.

He commenced to practice in Brooklyn in 1861 and from the first was interested in the advancement of his profession and the organizations connected with it. On June 12, 1862, he invited many of the dentists practicing in New York and Brooklyn to meet at his office and there organized the Brooklyn Dental Association, which became the most progressive and useful dental society of the time.

In 1867 he assisted in organizing the Brooklyn Dental Society, which tendered to him a banquet last December and at which he was the honored and happy guest.

In 1868 he was active in the organization of the Second District Dental Society and at Albany in the same year he assisted in organizing the Dental Society of the State of New York.

He was fully alive to the advantages of dental association and was one of the most active in obtaining legislation requiring the registration of dentists and the raising of the standard of education in our dental schools. In 1873, to show his earnestness, he went before the State Board of Censors and after successfully passing their examination had conferred upon him the degree of Master of Dental Surgery, M.D.S.

He was rarely absent from the meetings of any dental society of





which he was a member and his clear headed, earnest and direct manner of discussing the various subjects always lent an added interest.

We shall sadly miss our dear old friend and associate, for with the death of Dr. Hill there passed away one of the best known figures in the dental profession within the metropolitan district. Genial and warm-hearted, with marked individuality and at times seeming aggressiveness, he was ever a generous antagonist and was never happier than when assisting some young man who had sought his help or when doing a kindness to a friend.

He never married and his office and home were as unique in their appointments and furnishing as the strongly marked individuality of the man himself. He possessed a high artistic sense and his love of beautiful things combined with a cultivated taste made him a connoisseur in the collection of fine rugs, draperies, bric-à-brac and various other beautiful art creations.

*Resolved*, That the foregoing minute be entered in full upon the record book and a copy sent to the family of Dr. Hill and to the dental journals.

WILLIAM JARVIE,  
A. H. BROCKWAY,  
T. A. QUINLAN,  
F. T. VAN WOERT,  
R. OTTOLENGUI,  
F. C. WALKER,  
Committee.

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### **Dr. Frederick James Starr.**

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Died at his country residence in Mt. Vernon, N. Y., October 18, 1902, at the age of forty-nine years.

Frederick James Starr was born in Grand street, New York City, July 13, 1853, of an eminent professional family. His father, Dr. Alfred Starr, was one of the eminent dentists of his time, and is now living in Milford, Conn., where he made his home after his retirement from professional life. He was a surgeon on the staff of the Governor of New York, and first successfully suggested the introduction of the ambulance into the National Guard. He was the first, also, to make a set of teeth on celluloid or rubber.

Dr. Ira Starr, an uncle of the late Dr. Starr, was a skilled dentist, and had a large practice in New York City for a long time. A cousin, Dr.





## ITEMS OF INTEREST

A. R. Starr, is now professor in Operative Dentistry in the New York College of Dentistry.

The boy, Frederick, showed, at an early age, a general aptitude for science and mechanics. He was sent to New York public schools when very young and before he was sixteen he was apprenticed with Dr. Dudley Tenney and Dr. E. J. Seaman, to his father. Under his father's tutorship he benefited by a parent's interest in his son's future welfare and the result was that at nineteen he opened an office of his own on Lexington avenue near Forty-first street in New York City. He began, immediately, by dint of hard conscientious work and close application to form the nucleus of a large and wealthy practice. This was in 1871.

In 1879 he was registered before the Registering Board in New York City, and a few years later he removed his offices to West Thirty-fourth street, where he remained until 1898. From there he went to No. 226 West Forty-third street, where ill health compelled him to give up his New York practice and he retired to his beautiful home in Mt. Vernon. He was forced to retire from active life in May, 1902, on account of an illness that proved fatal. He had taken a heavy cold, and almost disregarding it it had settled into bronchitis, which in turn developed into tuberculosis of the larynx, and he died quietly in the midst of his sorrowing family October 18, 1902.

He is buried in the family plot in Bethel, Conn.

Dr. Charles Meickel, of New York City, who has been one of Dr. Starr's closest friends, has taken his practice.

Dr. Starr's career has been an interesting one as well as a valuable one to the dental profession. He was the inventor of a valuable amalgam carrier, and a dozen other instruments, that he, generously, donated to the profession.

He was a charter member of the Xavier Society, of which many prominent professional men are members, and was also charter member of the Crescent Club of Mt. Vernon. While in Thirty-fourth street he was appointed dentist to the Convent of the Sacred Heart in Manhattanville, the Convent of the Sacred Heart in Seventeenth street, and the Convent of the Sacred Heart in Fifty-fourth street and Madison avenue. He was one of the most eminent operators in prosthetic dentistry and was highly skilled in the art of regulating teeth.

His military career was long and meritorious. When quite a young man he joined the drum corps of the Second Regiment as a drummer under Drum Major Michael Cregan. Later he enlisted in the Third Regiment in Captain Henry Huss's company, and was honorably discharged with the rank of a first lieutenant. After that he entered Company "F" of the Seventh Regiment and rose to a second lieutenancy. Still fascinated



by military life he joined the Seventy-first Regiment as a private, after leaving and was honorably discharged in 1882 as a sergeant. He was with the regiment in New Orleans, La., at the opening of the B. & O. Railroad, when they attended the Mardi Gras.

Dr. Starr was a member of the New York State Dental Society, but dropped out of it after a few years. He was also a prominent member of the Royal Arcanum.

On December 10, 1873, he was married to Susan Dederer, of Mt. Vernon, a granddaughter of Stephen Hopkins, one of the signers of the Declaration of Independence. They were married by the Rev. William S. Coffey, for the last fifty-one years rector of historic St. Paul's Church, in Eastchester, at the Dederer residence in Mt. Vernon, which has ever since been their country home and where Dr. Starr spent his last days in the happiness of being surrounded by his devoted family.

The widow and her three children, Almira Dederer, Frederick James and Gertrude Hopkins, all prominent, survive him.

His son began his dental studies under him and continued for five years, but was deterred from entering college on account of ill health and is now with the Consolidated Dental Manufacturing Company of New York.

Two brothers, George O. Starr, and E. W. Starr, are still living. The elder of the two, George O. Starr, is a graduate of Medicine and Pharmacy, and is also a licensed dentist, but he is now a third owner of the Barnum & Bailey show.

The cutting short of this valuable career, while it was yet in its zenith, is an irreparable loss to the dental profession, but we are satisfied, while we grieve deeply with the bereaved family and sympathize with sorrowing friends, that this life was not in vain and that the good that has gone out of it to the profession and to the people generally will be lasting.

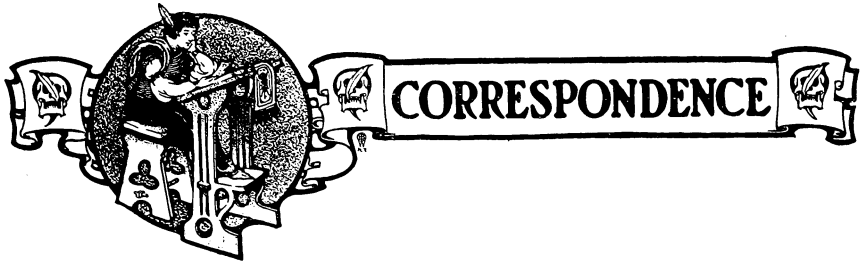
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### **Dr. G. A. Anderson.**

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Dr. G. A. Anderson, of Lyons, N. Y., died Nov. 27, 1902, after an illness of three months with typhoid fever.





### **Should Permanent Teeth Be Filled with Gold ?**

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Editor ITEMS OF INTEREST:

DEAR SIR: I read with interest your article in the November ITEMS OF INTEREST on "Should Permanent Teeth be Filled With Gold?" which led me to look up my record of over thirty-three years of practice in this city. For over fifteen years I was practically the only dentist on these islands, so, perforce, I was able to follow more closely than otherwise the success or failure of my operations. I began my practice with this sentiment, printed large: "Gold is the best material for filling the human teeth at all times and at all ages." Wherever the finances of my patient admitted, I filled the first permanent molar (provided there was no pulp complication) with gold at whatever age I found it in need. I filled my own children's teeth at six and seven years and hundreds of others, and with few exceptions have they needed refilling, save when undermined by caries from other than the occlusal surface. My theory and experience both have taught me the softer the tooth the greater the need of gold, with the exception of the anterior teeth, when the cavity at all approaches the pulp, especially in the teeth of the Hawaiians and half castes. As a rule I have found children more willing to submit to gold filling than persons of forty-five or fifty years of age. I think the subject an important one, for if the child is not started right it is much easier to go wrong afterwards. In the first place the child is less willing to take the longer and more tedious sitting, and, secondly, it is very much easier for the dentist to follow on with the method begun.

Yours fraternally,

Honolulu, T. H.

J. M. WHITNEY.

### **Celluloid.**

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Editor ITEMS OF INTEREST.

Dear Sir: I have been a subscriber for ITEMS OF INTEREST for a number of years and so take the liberty of addressing you. I make a great



## CORRESPONDENCE

many sets of artificial teeth each year, and want to hear something from somebody else about celluloid, and to start the discussion, I am going to say a few things myself. I find no trouble working celluloid plates using an Edison vulcanizer. I take my impressions in plaster and sand in an asbestos impression tray and get a metal cast direct from the impression. My plates are all made over metal: celluloid plates are non-breakable, they have no mercury in them; they are more nearly like the natural gum, and when made over a metal die of ordinary tinner's solder, they come out smooth and polished inside and slip off the cast with very little trouble, even when there are heavy undercuts.

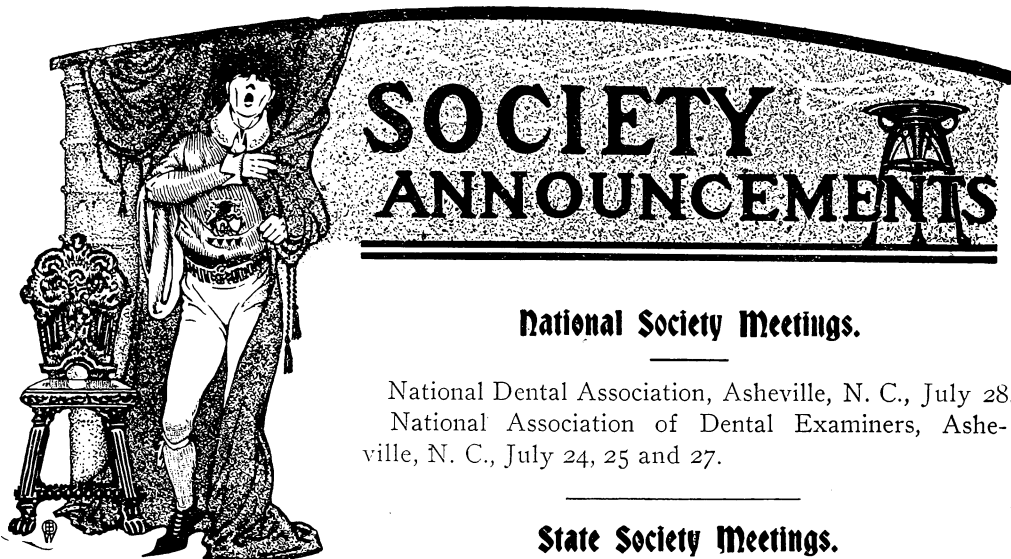
Celluloid was good enough for some very good dentists when Good-year had a royalty on rubber and when made under very trying circumstances. I know quite a number of successful dentists who are using celluloid, and praise it, but the average dentist seems to think a man who uses celluloid is in error. Generally he has never tried it.

If some one would get up a good white celluloid tooth, we would have no more teeth breaking off the plates; even the best porcelain teeth will frequently break. I have become convinced that a celluloid plate made over a metal cast fits more perfectly than a rubber plate made over plaster. Yours truly,

Vincennes, Ind.

T. H. MORGAN, D.D.S.





# SOCIETY ANNOUNCEMENTS

## National Society Meetings.

National Dental Association, Asheville, N. C., July 28.  
National Association of Dental Examiners, Asheville, N. C., July 24, 25 and 27.

## State Society Meetings.

California State Dental Society, San Francisco, June.  
Colorado State Dental Association, Denver, June 16, 17, 18.  
Connecticut State Dental Association, Hartford, April 21, '22.  
Florida State Dental Society, Seabreeze Beach, May 27.  
Georgia State Dental Society, Tallulah Falls, June 9.  
Idaho State Dental Society, Boise City, June 9.  
Maine Dental Society, July 21, 22, 23.  
Minnesota State Dental Association, Minneapolis, Sept. 1.  
Mississippi Dental Association, Vicksburg, May 21.  
Missouri State Dental Association, Kansas City, May.  
Nebraska State Dental Society, Lincoln, May 18.  
New Jersey State Dental Society, Asbury Park, July 15, 16, 17.  
New York State Dental Society, Albany, May 13, 14.  
Ohio State Dental Society, Columbus, Dec. 1, 2, 3.  
Tennessee Dental Association, Chattanooga.  
Texas State Dental Association, Houston, May, 1903.  
Vermont State Dental Society, Burlington, March 18, 19, 20.

## Vermont State Dental Society.

The twenty-seventh annual meeting of the Vermont State Dental Society will be held at the Van Ness House, Burlington, March 18, 19, 20.



## **Central Dental Association's Annual Banquet.**

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The annual banquet of the Central Dental Association of Northern New Jersey will be held at Achtelstetters, 843 Broad street, Newark, N. J., next door to the depot of the Central R. R., on Monday evening, February 16, at 7 p. m. All ethical dentists are cordially invited to come. The dinner will be up to the usual standard of former years, and as the room is more commodious, two hundred and fifty covers can be laid with comfort. The souvenir favor this year will equal that of 1902. The price per cover is the same, \$2.00. A remittance of that amount to Dr. Charles A. Meeker, 29 Fulton street, Newark, N. J., any time previous to February 15 will secure a seat.

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## **Delaware State Dental Society.**

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There will be a regular meeting of the Delaware State Dental Society on Wednesday, March 4. Regular meetings are held on the first Wednesdays in March, June, September and December of each year.

Wilmington, Del.

R. H. JONES, Secy.

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## **Odontographic Society.**

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At the annual meeting of the Odontographic Society of Chicago, the following officers were elected for 1903: President, F. B. Noyes; Vice-President, J. P. Buckley; Secretary, F. H. Zinn, 100 State street, Chicago; Treasurer, G. N. West; Board of Directors, F. E. Roach, L. O. Green, H. A. Drake. Board of Censors, D. M. Cattell, W. Girling, D. A. Hare.

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## **Odontological Society of Western Pennsylvania.**

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The Odontological Society of Western Pennsylvania will meet in Pittsburg, Pa., Tuesday and Wednesday, March 10 and 11, when it is expected to have the largest meeting of any in the history of the society.

The Executive Committee are arranging with some of our best lecturers to be in attendance, as well as a great number of exhibitors, making it the most successful meeting ever enjoyed.

C. B. BRATT, President.

B. M. LOAR, Secretary.





### **American Society of Orthodontists.**

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At the second annual meeting of the American Society of Orthodontists held in Philadelphia Oct. 8, 9 and 10, the following officers were elected: President, Milton T. Watson, D.D.S., Detroit, Mich.; Vice-President, Lloyd S. Lourie, D.D.S., Chicago, Ill.; Secretary, Anna Hopkins, D.D.S., St. Louis, Mo. Board of Censors: Richard Summa, D.D.S., St. Louis, Mo.; H. E. Lindas, D.D.S., Larned, Kansas; F. M. Casto, D.D.S., Columbus, Ohio. Committee on History and Invention: E. A. Bogue, M.D., D.D.S., New York, N. Y.; W. J. Brady, D.D.S., Iowa City, Iowa; Lloyd S. Lourie, D.D.S., Chicago, Ill.

St. Louis, Mo.

ANNA HOPKINS, Secretary.

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### **National Association of Dental Examiners.**

The National Association of Dental Examiners will convene at Asheville, N. C., commencing at 10 A.M., July 24, 25 and 27.

Kansas City, Kansas.

J. P. ROACH, D.D.S., Secretary.

